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Taxonomy of *Petriellidium*

by

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J.W. Carmichael

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Date May 29/1981

To my parents with love.

Abstract

Strains representing all species of *Petriellidium* plus representative strains of the Microascaceae and Pithoascaceae and *Thielavia* were examined in culture. Characters based on the ascospores, conidia and vegetative growth were recorded and used as attributes for both intuitive and quantitative "TAXMAP" (Carmichael 1980) comparisons.

Benny and Kimbrough's (1980) reclassification of the families Microascaceae and Pithoascaceae was supported by this study. Part of von Arx's (1973, 1978) classification of the genus *Petriellidium* was found to be unsatisfactory. A new key is proposed for the five species accepted in *Petriellidium*; (*P. africanum*, *P. angustum*, *P. boydii*, *P. desertorum* and *P. fimeti*). *P. ellipsoideum* and *P. fusoideum* are reduced to synonyms of *P. boydii* and *P. angustum* respectively. Composite descriptions are given for *P. angustum* and *P. boydii*. These two species were found to have identical *Scedosporium* states, but differed in ascospore size and shape. A discussion of the nomenclature of *P. boydii* is included.

The *P. boydii* strains examined did not reflect the wide variation in ascospore size recorded in the literature, but exhibited the moderate intra- and inter-strain variation one would expect in a single species.

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Abbreviations

BBL	Baltimore Biological Laboratory
°C	degrees centigrade
CBS	Centraalbureau voor Schimmelcultures
Cer.	Cereal agar
cm	centimeter
mins	minutes
ml	milliliter
mm	millimeter
Oat.	Oatmeal agar
PYE	Phytone Yeast Extract agar
Sab.	Sabouraud Dextrose agar
SEM	Scanning Electron Microscopy
UAMH	University of Alberta Mold Herbarium
μm	micrometer

I. Introduction

A. Occurrence and Nature of *Petriellidium boydii*

Petriellidium boydii is a widely distributed fungus that has been studied primarily because of its pathogenicity for man and animals. In man, *P. boydii* causes mycetoma, disseminated infections (Walker et al. 1978), brain abcesses (Winston et al. 1978), otomycosis, parotitis (Rippon and Carmichael 1976), keratomycosis (Bakerspigel 1971), sinusitis (Gluckman et al. 1977), pulmonary infections (Louria et al. 1966, Rippon 1981) and prostatitis (Meyer and Herrod 1961). In animals, *P. boydii* causes mycotic abortion in cattle and mycetoma in dogs and horses (Ainsworth and Austwick 1973).

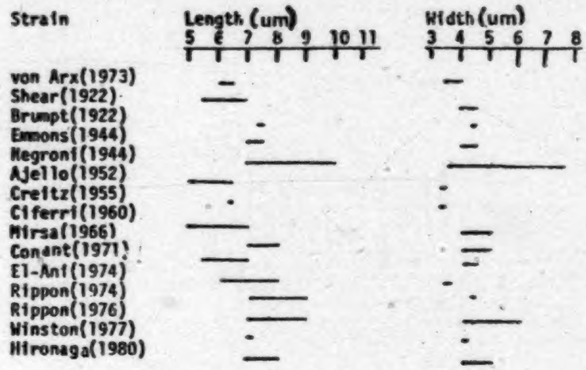
Rippon (1974) gives a complete description of mycetoma, its pathology and the etiologic agents. Mycetoma usually occurs on a hand or foot, following implantation of the fungus into the tissue via injury. There may be an extended time period before clinical manifestations occur (Shear 1922). The resultant infection consists of localized swollen lesions with draining sinuses and grains. These three characters collectively define "mycetoma". *P. boydii* produces a white grain mycetoma. Rippon defines a grain to be composed of "microcolonies" of fungus.

P. boydii has been recovered numerous times from soil. Ajello (1952) first reported its isolation from Tennessee farm soil. Since then many isolates of *P. boydii* from soil have been reported worldwide (Rippon 1974). Bell (1976) surveyed Alberta cattle feedlots for the occurrence of *P. boydii* in cattle manure. A number of *P. boydii* strains were recovered. He suggested that the fungus passed through the intestinal tract with the feed and was not a post excretion contaminant. Austwick (1976) isolated *P. boydii* from hay, grass and soil. He assumed it to be a main, high-temperature decomposer of organic matter. *P. boydii* has also been reported from marine environments (Pawar et al. 1965, Kirk 1967).

In culture *P. boydii* produces a "brownish mouse fur grey" colony (Rippon 1974). Clavate hyaline to dilute yellow-brown conidia are produced on annellated conidiogenous cells either diffusely (the *Scedosporium* state of *P. boydii*) or on synnemata (the *Graphium* state of *P. boydii*). The ascogenous state, when produced, consists of brown cleistothecia containing evanescent asci with eight ascospores.

Variation in the ascospore size of clinical isolates, as reported in the literature, was found to be larger than expected (Table 1), ranging from 3.4 x 5-6.5 um (Ajello 1952) to 3.5-7.5 x 7-10 um (Negroni and Fischer 1944). This variation leads to the question: is *P. boydii* two or more species, or is this intra-specific variation? The primary objective of this study was to answer this question. In addition, the relationship of *P. boydii* to other described *Petriellidium* species and the relationship of *Petriellidium* to the other genera of the Microascaceae were reviewed.

Table 1 Reported ascospore sizes for isolates referred to as *Petriellidium boydii*



The first author and date of the reference in which the *Petriellidium boydii* ascospore size is cited are included in Table 1.

B. History of the Classification of *P. boydii*

The diffuse conidial state was first described as *Monosporium apiospermum* by Saccardo (1911) based on Tarozzi's isolate from a mycetoma. At this time, Saccardo also suggested the generic name *Scedosporium*, but did not validate it. The generic name *Monosporium* is now regarded as a *nomen illegitimum* because its original species included the types of three earlier generic names, *Montospora*, *Peronospora* and *Streptothrix* (Hughes 1958). Castellani and Chalmers (1919) validated the generic name *Scedosporium* and published the combination *Scedosprium apiospermum*; however, most other investigators did not begin to use this name until the 1970's.

The synnematous conidial state is now referred to the form-genus *Graphium*. The history of *Graphium* was detailed by Crane and Schoknecht (1973). According to Siebenmann (1889), Harz and Bezold in 1889 described *Verticillium graphii*, isolated a number of times from ear infections, which was probably the *Graphium* state of *P. boydii*. Mason (1941) discussed Vuillemin's transfer of this species to *Glenospora* in 1912. Shear (1922) described the *Graphium* state of his *Allescheria boydii* as *Dendrostilbella boydii*. *Dendrostilbella* is now regarded as having a phialidic form of conidial development whereas *the Graphium* state of *P. boydii* has annellidic conidiogenesis. (Carmichael et al. 1980)

The sexual state of *P. boydii* was first described by Shear (1922) based on Boyd and Crutchfield's clinical isolate from an ankle mycetoma. Shear referred the isolate to Saccardo and Sydow's genus *Allescheria*. He proposed names for the three states of the fungus; *Allescheria boydii* for the ascogenous state, *Cephalosporium boydii* for the diffuse conidial state and *Dendrostilbella boydii* for the synnematous state. He did not realize that the conidial states had been previously described.

The relationship between *Allescheria boydii* and *Scedosporium apiospermum* was not discovered until several years later. Jones and Alden (1931) described a *Monosporium apiospermum* mycetoma isolate and its production of black sclerotium-like bodies, which they thought were probably perithecia, although they did not see asci.

Emmons (1944) discovered *Allescheria boydii* to be the ascogenous state of *Monosporium apiospermum* when an Alberta mycetoma isolate (Dowding 1935), which for six years in his collection had yielded only the conidial state, began producing ascocarps.

Negroni and Fischer (1944) described a fungus isolated from a knee paramycetoma, naming it *Pseudallescheria shearii*. They claimed it differed from *Allescheria boydii* in ascus shape and conidial morphology. However, MacKinnon (1951) regarded it as *Allescheria boydii*, and the name *Pseudallescheria* never came into common use.

MacKinnon (1951) questioned the relationship of *Allescheria boydii* as the sexual state of *Monosporium apiospermum* claiming that the conidial state of *Allescheria boydii* was not of the *Monosporium* type, but rather a *Cephalosporium*. In 1954 he refuted his observation attributing the discrepancy to a contaminated culture.

Malloch (1970) transferred *Allescheria boydii* to his newly proposed genus *Petriellidium*, because in his opinion its characters did not fit the genus *Allescheria*. Malloch was not aware of Negroni and Fischer's publication of *Pseudallescheria*.

C. Nomenclator of *P. boydii*

Petriellidium boydii (Shear) Malloch 1970
        =*Allescheria boydii* Shear 1922
    =*Pseudallescheria shearii* Negroni et Fischer 1944

Scedosporium state of *P. boydii*
    =*Monosporium apiospermum* Saccardo 1911
        =*Scedosporium apiospermum* (Sacc.) Castellani et Chalmers 1919
    =*Cephalosporium boydii* Shear 1922

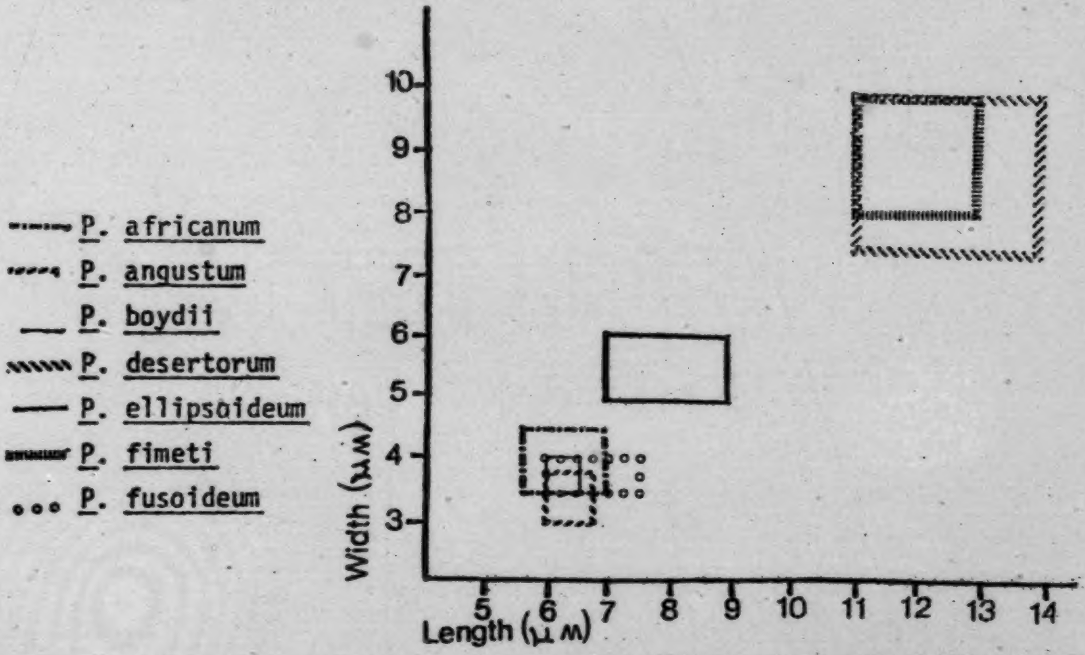
Ciferri (1960) lists other probable synonyms of *Scedosporium apiospermum.*

Graphium state of *P. boydii*
    ?=*Verticillium graphi* Harz et Bezold 1889
        =*Glenospora graphii* (Harz et Bezold) Vuillemin 1912
    =*Dendrostilbella boydii* Shear 1922
        =*Glenospora boydii* (Shear) Poll. et Nannizzi 1929

D. Other species described in *Petriellidium*

Malloch and Cain (1972) added *P. angustum*, isolated from a sewage half digestion tank. Von Arx (1973) revised *Petriellidium* to add four species; *P. africanum, P. ellipsoideum, P. fusoideum and P. desertorum.* He also included a key to the genus *Petriellidium.* In 1978, von Arx added a seventh species to the genus, *P. fimeti*. All species with the exception of *P. boydii* were isolated from soil and dung. Von Arx differentiated the *Petriellidium* species mainly on the basis of ascospore size and shape. As shown in Fig. 1, his ascospore measurements for some of the species overlap. Three clusters are evident; the first consists of four species, *P. africanum, P. angustum, P. boydii and P. fusoideum*, the second cluster consists of a single member *P. ellipsoideum* and the third cluster consists of *P. desertorum* and *P. fimeti*. The overlaping of the ascospore sizes raises the question of the validity of some of the species.

Fig. 1 Ascospore size in ranges of length and width according to von Arx (1973,1978)



The ascospore sizes in ranges of length and width are represented by the boxes.

E. *Petriellidium* and its relationship to the Microascaceae

Luttrell in 1951 proposed the family Microascaceae (class Plectomycetes) to accommodate the genus *Microascus*. *Microascus* was formerly placed in the Ophiostomataceae, but differed in centrum structure. *Petriella* was later included in the Microascaceae by Corlett (1966). Malloch (1970) further revised the family to include *Kernia*, *Lophotrichus* and *Petriellidium* along with *Petriella* and *Microascus*. Von Arx (1973) enlarged the Microascaceae to include *Pithoascus*. Also in 1973, Udagawa and Furuya included *Leuconeurospora* in the Microascaceae. The genus *Faurelina* was included by Locquin-Linard (1975) and in 1977 she also included *Enterocarpus*. Von Arx (1978) updated the key to the Microascaceae and questioned the position of some genera. Benny and Kimbrough (1980) made major revisions to the orders and families of the Plectomycetes. They included a detailed taxonomic history of the orders and families of the Plectomycetes, plus keys to the genera. The Microascales was defined to include three families; Microascaceae, Pithoasaceae and Chadefaudiellaceae. The family Microascaceae was redefined to include six genera; *Petriella*, *Petriellidium*, *Enterocarpus*, *Microascus*, *Kernia* and *Lophotrichus*. *Pithoascus* and *Faurelina* were transferred to a new family, the Pithoascaceae. A new family, the Chadefaudiellaceae with one genus *Chadefaudiella* was proposed.

F. Descriptions of the genera of the Microascaceae

Enterocarpus Locquin-Linard 1977

Type species: *E. unisporus* Locquin-Linard 1977. *Enterocarpus* was described as having non-ostiolate, dark brown to black ascocarps with long tufts of hair-like appendages. The reddish ascospores are oval and surrounded by a hyphal capillitium. No conidial state is known.

Kernia Nieuwland 1916

Type species: *K. nitida* (Saccardo) Nieuwland 1916. *Kernia* was described by Malloch and Cain (1971) as having thick-walled, non-ostiolate, dark brown to black ascocarps with fascicles of hair-like appendages. The reddish brown to brown ascospores are ellipsoidal to reniform. The conidial state when present is *Scopulariopsis* or *Graphium* or an arthrospore state.

Lophotrichus Benjamin 1949

Type species: *L. ampullus* Benjamin 1949. *Lophotrichus* was described by Malloch (1970) as having ostiolate, dark brown ascocarps with a neck. The golden ascospores are ellipsoidal to slightly asymmetrical. No conidial state is known.

Microascus Zukal 1885

Type species: *M. longirostris* Zukal 1885. *Microascus* was described by Barron et al. (1961) as having ostiolate, dark, carbonaceous, perithecium-like ascocarps with necks. The ascospores extrude from the mouth of the neck in a long red-brown cirrhus and occur in a variety of forms; oval, concavo-convex, plano-convex or triangular. The conidial state is *Scopulariopsis*, *Wardomyces* or *Wardomycopsis*, or in one species lacking.

Petriella Curzi 1930

Type species: *P. sordida* (Zukal) Barron et al. 1961. *Petriella* was described by Barron et al. (1961) as having an ostiolate, black, carbonaceous, perithecium-like, necked ascocarp. The red-brown asymmetrical to ellipsoidal ascospores are extruded in a cirrhus. The conidial states belong to *Sporothrix* and/or *Graphium*.

Petriellidium Malloch 1970

Type: *P. boydii* (Shear) Malloch 1970. *Petriellidium* was described by von Arx (1973) as having non-ostiolate, brown, ascocarps. The ascospores are golden, symmetrical and ellipsoidal. The conidial states belong to *Scedosporium* and/or *Graphium*.

II. Materials and Methods

A. Strains

At the beginning of this study, the University of Alberta Mold Herbarium and Culture Collection (UAMH) contained a number of strains identified as *P. boydii*. Additional isolates of *P. boydii* were obtained from J. Kane, Ontario Ministry of Health and by soil sampling of Edmonton area pastures. Type strains of the other *Petriellidium* species and other members of the Microascaceae were used whenever possible. Details of the source of each strain and its original identification are given as part of the description of the individual strains.

Table 2 lists the strains examined according to their identification at the start of the study. The authors and places of publication of the names are given here for convenience. The strains examined included; 35 isolates previously identified as *P. boydii* (or one of its conidial states); 6 isolates identified as other *Petriellidium* species, and 21 strains representing species of related genera, *Kernia, Lophotrichus, Microascus* and *Petriella*. Strains of *Pithoascus, Faurelina* and *Thielavia*, were also included because of their similarity with the Microascaceae.

Table 2 Strains examined

Microascaceae

Petriellidium	
P. boydii (Shear) Malloch Mycologia 62:738 1970	38 strains
P. africanum v. Arx & Franz Persoonia 7:370 1973	UAMH 4000
P. angustum Malloch & Cain Can. J. Bot. 50:66 1972	UAMH 3984
P. desertorum v. Arx & Moustafa Persoonia 7:371 1973	UAMH 3993
P. ellipsoideum v. Arx & Fassatiova Persoonia 7:370 1973	UAMH 3987
P. fimeti v. Arx, Mukerji & Singh Persoonia 10:26 1978	UAMH 4257
P. fusoideum v. Arx Persoonia 7:371 1973	UAMH 3997
Kernia	
K. nitida (Sacc) Nieuwland Amer. Mid. Nat 4:379 1916	UAMH 3060
Lophotrichus	
L. ampullus Benjamin Mycologia 41:347 1949	UAMH 1762
Microascus	
M. desmosporus (Lechmere) Curzi Boll. Staz. Pet. veg. Roma. 11:60 1931	UAMH 966
M. intermedius Emmons and Dodge Mycologia 23:324 1931	UAMH 2469
M. longirostris Zukal Verh. zool-bot Ges Wien 35:339	

Table 2 (continued)

1885 UAMH 408

M. manginii (Loub.) Curzi Boll. Staz. Pat. veg. Roma. 11:60 1931 UAMH 2642

M. singularis (Sacc.) Malloch & Cain Can.J.Bot. 49:859 1971 UAMH 2637

M. trigonosporus Emmons & Dodge Mycologia 23:317 1931 UAMH 655

Petriella

P. guttulata Barron & Cain Can. J. Bot. 39:841 1961 UAMH 3996

P. lindforsii Curzi Boll. Staz. Pat. veg. Roma. 11:380-423 1931 UAMH 3999

P. musispora Malloch Mycologia 62:728-731 1970 UAMH 3986

P. setifera (Schmidt) Curzi Boll. Regia. Staz. Patol. Veg. 10:382 UAMH 805 1662 1924 2702

P. sordida (Zukal) Barron & Gilman Can. J. Bot. 39:839 1961 UAMH 1410 3983 3985

Pithoascaceae

Faurelina

F. elongata (Udawaga & Furaya) v. Arx Persoonia 10:27-28 1978 UAMH 4232

Pithoascus

P. langeronii v. Arx Proc. K. Ned. Akad. Wet. (C) 76:295 1973 UAMH 4234

Table 2 (continued)

Chaetomiaceae

Thielavia

T. terricola (Gilman & Abbot) Emmons Bul. Torry Bot. Club. 57:124 1930 UAMH 1918

B. Media

The following media were employed in this study.

1. Oatmeal agar

Magnesium sulfate	1 g
Potassium dihydrogen phosphate	1.5g
Sodium nitrate	1g
Oatmeal	10g
Agar	18g
Water	1000ml

2. Cereal agar

Pablum Mixed Cereal, (Mead Johnson)	100g
Agar	15g
Water	1000ml

3. Phytone Yeast Extract agar (BBL)

Dextrose	40g
Phytone	10g
Yeast extract	5g
Streptomycin	.03g
Chloramphenicol	.05g
Agar	17g

Water	1000ml

4. Sabauraud's Dextrose agar (Difco)

Dextrose	40g
Neopeptone	10g
Agar	15g
Water	1000ml

5. Rose Bengal medium

Czapek Solution agar (Difco)	49g
Rose Bengal dye (Matheson, Coleman and Bell)	.675g
Streptomycin (Allen and Hanbury)	.03g
Water	1000ml

All media were sterilized by autoclaving at 121°C at 15 pounds steam pressure for 15 minutes. Approximately 35 mls of the medium was transferred to a 90 mm plastic petri plate and allowed to cool.

C. Standard Culture Conditions

Transfers and inocula

Working stock cultures on cereal slants were prepared from the frozen or lyophilized UAMH collection and incubated at 25°C for 1 - 2 weeks until most of the agar surface was covered by mycelial mat. The stock cultures were then kept at 4°C.

A small piece of the stock culture mycelial mat was transferred to the center of agar plates for growth. Each strain was inoculated to Oat., Cer., PYE and Sab. agar plates at three separate times for the *Petriellidium* strains and one to two times for the other genera and incubated at 25°C.

Temperature

Oat. plates of the *Petriellidium* strains contained in the culture collection at the beginning of the study were incubated at 18°C, 25°C and 30°C for 31, 63 and 100 days. Oat. plates for all the *Petriellidium* species, and the remaining genera of the Microascaceae, *Faurelina*, *Pithoascus* and *Thielavia* were incubated at 37°C, 40°C, 45°C and 50°C until the maximum growth temperature had been determined. The plates were sealed with tape to retard drying.

All other plates were incubated at 25°C unless otherwise stated.

Incubation

Cultures were incubated in the inverted position unless otherwise stated. Cultures were examined for one month (31 days) then held for at least two months with daily fluorescent room light for examination for cleistothecial production. If the culture was to be held for an extended period of time e.g. five months it was placed in a plastic bag.

Descriptions

Each colony on Oat., Cer., PYE and Sab. agar was examined every four days for growth characteristics and production of the ascosporic and synnematous states. After 31 days, mounts were made for microscopic examination.

Cleistothecium production

Several methods were tried to induce non-cleistothecium producing strains of *Petriellidium* to produce cleistothecia.

1. Cultures were incubated over extended time periods, up to five months at 25°C.
2. Cultures were incubated at 18°C and 30°C for 100 days in plastic bags.
3. Cultures were incubated at 25°C for four months, then at 4°C for two months.
4. Cultures were incubated at 25°C for one month then traumatized by slicing the mycelial mat with an inoculating needle and re-incubated for at least one month.
5. Cultures were inoculated on PYE slants, incubated for two weeks, placed in a freezer at -20°C for two weeks, then incubated at 25°C for three months.
6. Crossing experiments with non-cleistothecium producing strains were performed by L. Sigler. The strains examined included UAMH 0800, 3230, 3873, 3904 and 3905. All possible pairs of strains were streaked side by side on Cer. plates and incubated at 25°C for 55 days. The colonies were examined at various times for cleistothecia.

Ascospore germination studies

Mature cleistothecia of *Petriellidium* and *Petriella* species were removed from approximately two month old Oat. plates (Cer., if no cleistothecia were found on the Oat.

plate) and washed in a drop of sterile distilled water in a welled slide. A cleistothecium was then transferred to a test tube with 10 drops of sterile water. The cleistothecium was crushed and the suspension mixed thoroughly. Two drops of the suspension were placed on a PYE slide culture and allowed to dry. A coverslip was placed over the modified slide culture. Slide cultures were prepared according to the Mycologist's Handbook (Hawksworth 1974) except that the bent glass rod was replaced with two sterile applicator sticks. Two drops of molten PYE agar were dropped onto the slide and allowed to cool. The sterile filter paper was not moistened unless after five days of incubation at 25°C the ascospores had not germinated. The slide was examined daily for germination of the ascospores. Pictures of germinating ascospores were taken.

Scanning Electron Microscopy

Cultures were examined for the presence of mature cleistothecia (as judged by color and size). Cleistothecia of Oat. cultures were mostly submerged within the agar, while those found on other media were within the mycelial mat.

Blocks of agar or mycelial mat approximately 3x3x1 mm containing mature cleistothecia were cut from the sporulating colonies, placed in 1% osmium tetroxide in Sorenson's buffer and left overnight. The blocks were washed three times with Sorenson's buffer then dehydrated in an alcohol series (30%, 50%, 70%, 80%, 90% and 95%) for 30 minutes at each step. After dehydration the agar block was placed on a round coverglass. The cleistothecia were removed from the agar block and crushed open, liberating the ascospores. An intact cleistothecium was also dried on the coverglass. The coverglass with ascospores was allowed to dry overnight. If the specimen could not be examined immediately it was placed in a desiccator. The dried coverglass holding the specimen was glued to an aluminum stub, gold plated by the sputter technique and examined with a Cambridge Stereoscan S150 Scanning Electron Microscope.

Light microscopy and photography

Microscope preparations from colonies or slide cultures were made in glycerine jelly (Ainsworth 1971) mounting medium. The preparations were examined under a Zeiss phase microscope.

Photographs were taken with a 35mm camera with Kodak Panatomic X film. Photographs of colonies after 4 days incubation were taken with the same camera but attached to a stereomicroscope. Photographs of colonies after 21 days incubation were taken with a 35mm camera attached to a copy stand.

D. Pasture soil samples

28 soil samples were taken in the summer of 1980 from the superfical layer of pastures in the Edmonton area. In most cases hay and manure were present in the sample. One sample consisted only of manure and three others contained

chicken litter. Samples were placed in plastic bags and stored at room temperature until processed by two different procedures.

Padhye and Thirumalachar (1968) Method

Approximately one gram of soil was suspended in 30 ml of sterile antibiotic water containing 5000 units/ml sodium penicillin and 1000 units/ml streptomycin sulfate. The mixture was shaken and allowed to stand for one hour, after which one ml of supernatant was pipetted to PYE agar plates, spread with a glass spreader and incubated at 37°C. The majority of saprophytes are inhibited by the high temperature. The plates were incubated in the upright position for the first 24 hours to dry, then inverted. They were examined daily until overgrown with *Rhizopus* species, usually in about 3 days. Separate recognizable colonies were transferred to PYE agar plates at 37°C for subsequent identification.

Bell (1976) dilution method

Approximately one gram of soil was suspended in antibiotic water prepared as in the previous procedure; then serial dilutions were made in distilled water. One ml of the original and the 1:100 and 1:1000 dilutions were spread onto Rose Bengal agar plates and incubated at 37°C in the dark. A control plate was inoculated with *P. boydii* to check that growth conditions were suitable. The plates were examined after 4 days and every two days thereafter until no new colonies were evident.

Mounts of colonies to be identified were made in lactofuchsin. Identifications of the Hyphomycetes to generic level were made with the assistance of "The Genera of Hyphomycetes" (Carmichael et al. 1980) and to the species level using the specified references.

E. Wood samples

37 samples of wood soaked in sea water were collected during the summer of 1980 from the estuary of the Shediac River in N. B., wrapped in foil and placed in plastic bags. The samples were stored at room temperature until processed two weeks later.

Small (approximately 1cm x 5 mm x 1mm) chips were removed with a sterile scalpel and placed in five ml of sterile water, mixed and allowed to stand. A one ml sample was transferred to a Rose Bengal agar plate and spread with a sterile glass spreader. The plates were incubated in plastic bags at 37°C as noted with the soil samples. The plates were examined after four days and every two days thereafter for 14 days. Any colonies found were transferred to a PYE plate for identification. The wood samples were also placed in Petri dishes on top of a moistened filter paper and incubated at 37°C for two months then transferred to 25°C for five months. The wood samples were examined under a stereomicroscope and mounts were prepared in lactofuchsin from any sporulating growth on the wood. Cultures with different salt concentrations were not attempted.

F. Transmission EM studies for viruses

The *P. boydii* strain UAMH 2324 was atypical and exhibited "poor growth". It did not produce aerial hyphae and at times the transfers failed to grow. Electron microscopic studies were performed in the hope of determining if a viral infection was present.

A block of hyphal mat, approximately 3x3x1 mm was cut from a culture growing on Cer. agar at 25°C. UAMH 2 was used as a control. The mycelial mats were fixed as previously described for SEM. A final rinse of absolute alcohol, followed by two rinses in propylene oxide were included. The samples were embedded in epon and heated to 60°C overnight.

The samples were cut and sectioned by a Richert OMU 2 sectioner, placed on a copper grid, stained with uranyl acetate for 10 mins, rinsed in methanol followed by a water rinse then further stained with lead citrate for 6 mins, rinsed and allowed to dry. A Philips EM 300 transmission electron microscope was used to examine the sections for the presence of viral particles and photographs of the sections were taken.

G. Quantitative analysis

Data obtained from observations on the studied strains were analysed by the "TAXMAP" computer classification program (Carmichael 1980) The program classifies the strains into clusters of related strains by performing a series of statistical evaluations on the data (attribute values) and provides a taxometric map illustrating the inter-cluster relationships.

The analysis is performed with either differentially or equally weighted attributes. In the differential analysis, the attribute weight is calculated as the base 2 log of the number of classes over the range of the attribute (a class being one confidence interval wide) allowing good attributes to be stressed. In the equally weighted analysis the weight of every attribute is set at one.

The relative difference between pairs of strains or Operational Taxonomic Units (OTU's) is computed for each attribute, then the average difference between the pairs of OTU's for all attributes is determined. Clusters are defined by four criteria; (1) the single linkage criterion ("the single link compared to the average of the preceding single links") (2) the average linkage criterion ("a measure of closeness to all the members of the cluster") (3) the ratio criterion ("the minimum similarity between any pair of points in the cluster divided by the minimum similarity between the point being considered for admission and any point in the cluster") and (4) exclusion of points contained within another cluster (Carmichael et al. 1968).

Strains analysed

All strains listed in Table 2 were included in the quantitative analysis and two additional strains; a *Microascus desmosporus* and *Thielavia basicola* UAMH 4305.

Attributes

The attributes used in the quantitative analysis are listed in Table 3.

Table 3 Attributes used in the quantitative analysis

```
KEY TO ATTRIBUTE TYPES - BY WEIGHTING PROCEDURE
     0  = DELETE, WEIGHT =0.
     1  = SET WEIGHT TO 1.0.
     2  = WEIGHT AS LOG2 OF NO. OF CONFIDENCE INTERVAL CLASSES IN RANGE.
     3-N= MATCH WEIGHT = LOG2 N, NO-MATCH WEIGHT = 1.0.

ATTRIBUTE NO TYPE NAME AND STATES (0/1/2/ETC)                              95% CONFIDENCE INTERVAL

          1    2  ASCOMATA DIA. MICRONS MIN.                                                  65.26
          2    2  ASCOMATA DIA. MICRONS MAX.                                                  65.26
          3    2  ASCOSPORE LENGTH MICRONS MIN.                                                2.12
          4    2  ASCOSPORE LENGTH MICRONS MAX.                                                2.12
          5    2  ASCOSPORE WIDTH MICRONS MIN.                                                 1.60
          6    2  ASCOSPORE WIDTH MICRONS MAX.                                                 1.60
          7    2  DIFFUSE CONIDIA LENGTH MICRONS MIN.                                          3.28
          8    2  DIFFUSE CONIDIA LENGTH MICRONS MAX.                                          3.28
          9    2  DIFFUSE CONIDIA WIDTH MICRONS MIN.                                           2.20
         10    2  DIFFUSE CONIDIA WIDTH MICRONS MAX.                                           2.20
         11    2  GRAPH. CONIDIA LENGTH MICRONS MIN.                                           3.78
         12    2  GRAPH. CONIDIA LENGTH MICRONS MAX.                                           3.78
         13    2  GRAPH. CONIDIA WIDTH MICRONS MIN.                                            1.62
         14    2  GRAPH. CONIDIA WIDTH MICRONS MAX.                                            1.62
         15    2  CHLAMYDO LENGTH MICRON MIN                                                   4.58
         16    2  CHLAMYDO LENGTH MICRON MAX                                                   4.58
         17    2  CHLAMYDO WIDTH MICRON MIN                                                    4.28
         18    2  CHLAMYDO WIDTH MICRON MAX                                                    4.28
         19    2  COLONY COLOR                                                                 4.00
         20    3  REVERSE COLOR(LIGHT 1  MOD DARK 2  DARK 3)                                   1.00
         21    2  ORANGE PIGMENT PRESENT/ABSENT                                                1.00
         22    2  GROWTH AFTER 28 DAYS ON OATMEAL AGAR                                         4.00
         23    2  TYPE OF GROWTH (0-NOT FURRY 1-FURRY)                                         1.00
         24    2  CLEIST. OSTIOLE PRESENT/ABSENT                                               1.00
         25    2  CLEIST. HAIR PRESENT/ABSENT                                                  1.00
         26    2  CLEIST. PRESENT/ABSENT                                                       1.00
         27    6  ASCOSPORE (ELLIP 1  HEART 2  ALLA 3  TRI 4  OTH 5  ABSENT 0)                 1.00
         28    5  DIFFUSE CONIDIA STATE (SCEDO 1  SPORO 2  SCOP 3  ARTH 4  ABSENT 0)           1.00
         29    2  GRAPH. CONIDIA PRESENT/ABSENT                                                1.00
         30    2  BROWN CHLAMYDO PRESENT/ABSENT                                                1.00
         31    2  MAX GROWTH TEMP (BELOW 37 -1  37 -2  40 -3  45 -4  ABOVE 45 -5)              1.00
         32    2  CLEIST.DIA. MICRONS AVERAGE                                                 65.26
         33    2  ASCOSPORE LENGTH MICRONS AVERAGE                                             2.12
         34    2  ASCOSPORE WIDTH MICRONS AVERAGE                                              1.60
         35    2  DIFFUSE CONIDIA LENGTH MICRONS AVERAGE                                       3.28
         36    2  DIFFUSE CONIDIA WIDTH MICRONS AVERAGE                                        2.20
         37    2  GRAPH  CONIDIA LENGTH MICRONS AVERAGE                                        3.78
         38    2  GRAPH. CONIDIA WIDTH MICRONS AVERAGE                                         1.62
         39    2  CHLAMDO LENGTH MICRON AVERAGE                                                4.58
         40    2  CHLAMYDO WIDTH MICRON AVERAGE                                                4.28
```

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Measurements of the ascospores and conidia were made from camera lucida drawings of 25 conidia or ascospores from slides from the standard media set or slide cultures and slides contained within the UAMH slide collection. Ten ascomata were measured with an ocular scale. The mean and standard deviation were calculated for each data set. The maximum, minium and average of the measurements were used as attribute values.

The ascomata were scored as 1-present, 0-absent. The presence or absence of an ostiole and external hair were also scored.

Ascospore shape was coded by six non-ordered classes; 1-ellipsoidal, 2-heart shaped, 3-allantoid, 4-triangular, 5-other, and 6-absent.

The diffuse conidial state was coded by five non-ordered states describing the type of conidium development; 1-*Scedosporium*, 2-*Sporothrix*, 3-*Scopulariopsis*, 4-Arthroconidia and 5-absent. The presence or absence of the *Graphium* conidial state and brown chlamydospores were coded as 1-present , 0-absent.

The type of hyphal mat was coded as being furry that is similar to rabbit's fur, - 1 or not - 0.

The maximum growth temperature on Oat. after 21 days incubation was coded as five ordered classes; 1-below 37°C, 2-37°C, 3-40°C, 4-45°C, and 5-above 45°C.

The vegetative colony color on Oat. after 28 days incubation at 25°C was coded as 18 ordered classes ranging from clear to deep olive green. Empty classes were left between colours that were especially distinct. The colours were not based on a colour code standard such as Ridgway 1912 (Hawksworth 1974) because the descriptions become meaningless if the code is not available.

Clear	1
Off white	3
Light camel	4
Light mouse brown	5
Moderate mouse brown	6
Moderate mouse brown grey	7
Dark mouse brown	8
Light grey	10
Moderate silver grey	11
Dark grey	12
Light grey green	14
Deep grey green	15
Moderate olive green	17
Dark olive green	18

Reverse color on Oat. agar after 28 days incubation at 25°C was coded as three ordered classes; 1-light, 2-moderately dark or with dark patches or 3-dark.

The colony size on Oat. after 28 days incubation at 25°C was coded as the diameter in mm, or 90 mm if filling the petri plate.

Characters in which the variation within the strain was as large as the variation between the strains were not used, i.e., ascus size and shape.

When data were unavailable a value of 999 was assigned and assessed as missing data by the TAXMAP program.

III. Results and Discussion

A. Preliminary and miscellaneous investigations

Pasture soil and wood survey

The pasture soil survey of 28 samples from pasture areas around Edmonton, Alberta yielded the following fungi;

Species present	No.of samples
Rhizopus species	23
Phoma species	1
Aspergillus fumigatus	22
Aspergillus nidulans	1
Aspergillus niger	1
Aspergillus ustus	3
Scopulariopsis brevicaulis	8
Scopulariopsis konigii	3
Chrysosporium luteum	2
Chrysosporium parvum	1
Fusarium oxysporum	1
Penicillium species	1
Thielavia basicola	1
Petriellidium boydii	2

Of the three *P. boydii* strains isolated, UAMH 4408 produced the *Petriellidium* and *Graphium* states, the other two strains UAMH 4409 and UAMH 4410 both produced only the *Graphium* and *Scedosporium* states. Because the soil samples contained bits of hay and manure, it is not certain, whether the *P. boydii* isolates came from these substances or from the other soil components.

An interesting isolate from the soil survey proved to be *Thielavia basicola* UAMH 4305. *Thielavia* produces ascospores similiar in size and shape to *Petriellidium*, but differs in ascospore colour, conidial state and hyphal mat. Malloch and Cain (1973) previously reported the isolation of *Thielavia basicola* from soil.

The survey of 28 wood samples from estuary of the Shediac River, N. B. yielded the following results;

Species present	No. of samples
Aspergillus fumigatus	4
Chrysosporium tropicum	1
Culcitalna achraspora	16
Microascus desmosporus	1

The wood survey did not yield *Petriellidium boydii*. Kirk (1967) isolated *P. boydii* from wood baits in an estuary in North Carolina. Pawar et al. (1965) isolated the *Scedosporium* state of *P. boydii* from saline mangrove flats. A member of the Microascaceae was isolated, *Microascus desmosporus*.

B. Effects of media, time and temperature on *P. boydii* ascospore and conidial sizes

Comparisons of ascospores and conidia using a representative sample of five *P. boydii* strains (UAMH 0002, 0153, 1265, 1865, and 2217) producing both the ascogenous state and diffuse conidial state were made to determine if medium, time or temperature affected ascospore or conidial size. The conditions tested were:

1. Four media; Oat., Cer., PYE and Sab. after 31 days incubation at 25°C.
2. Oat. agar after seven and 14 days incubation at 25°C.
3. Oat. agar after 31 days incubation at 18, 25 and 30°C.
4. Oat. agar after 63 days incubation at 18, 25 and 30°C.
5. Oat. agar after 100 days incubation at 18, 25 and 30°C.

The results are shown in Figs. 2-10. The ascospore and conidium measurements, two standard deviations and the mean are represented by a line. The blank space in its middle represents the mean. The dots at either end of the line represent two standard deviations from the mean. Since no consistent differences were evident, it was concluded that comparisons of ascospores and conidia could be made with slides made from cultures grown for different times, or at different temperatures or on different media, within the limits of the test conditions.

The rate of ascospore maturation varied with the medium used. A mature ascospore was defined to be golden in brightfield microscopy. Plate 1 shows immature ascospores (UAMH 2217) contained within asci after one month incubation on PYE agar at 25°C. A mature ascospore is shown for comparison in the lower right photograph. There is considerable size variation among the immature ascospores,

Fig. 2 Conidial measurements from cultures on the four media after 31 days incubation at 25°C.

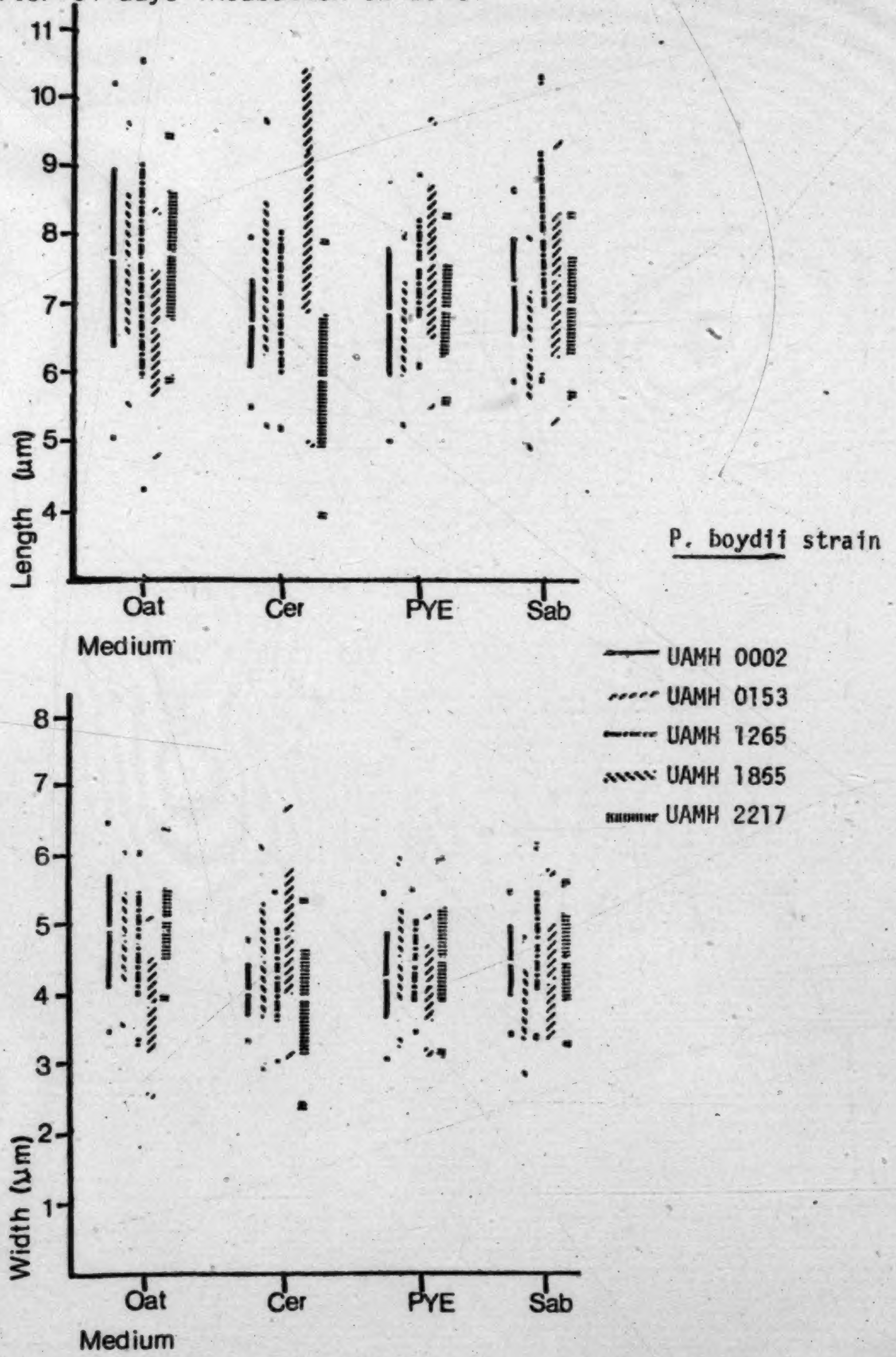


Fig. 3 Ascospore measurements from cultures on the four media after 31 days incubation at 25°C.

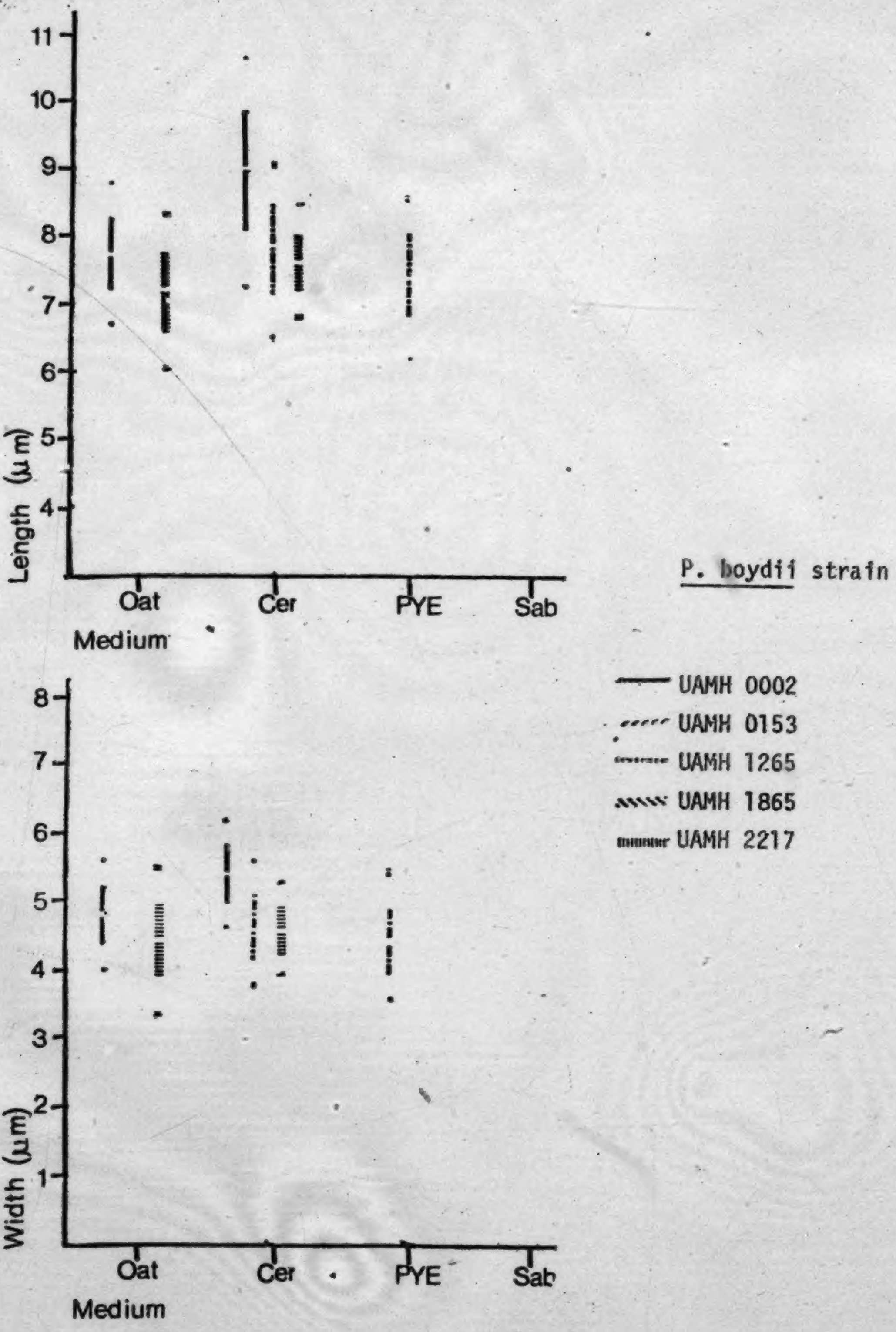


Fig. 4 Conidial measurements after 7 and 14 days incubation on Oat. at 25°C.

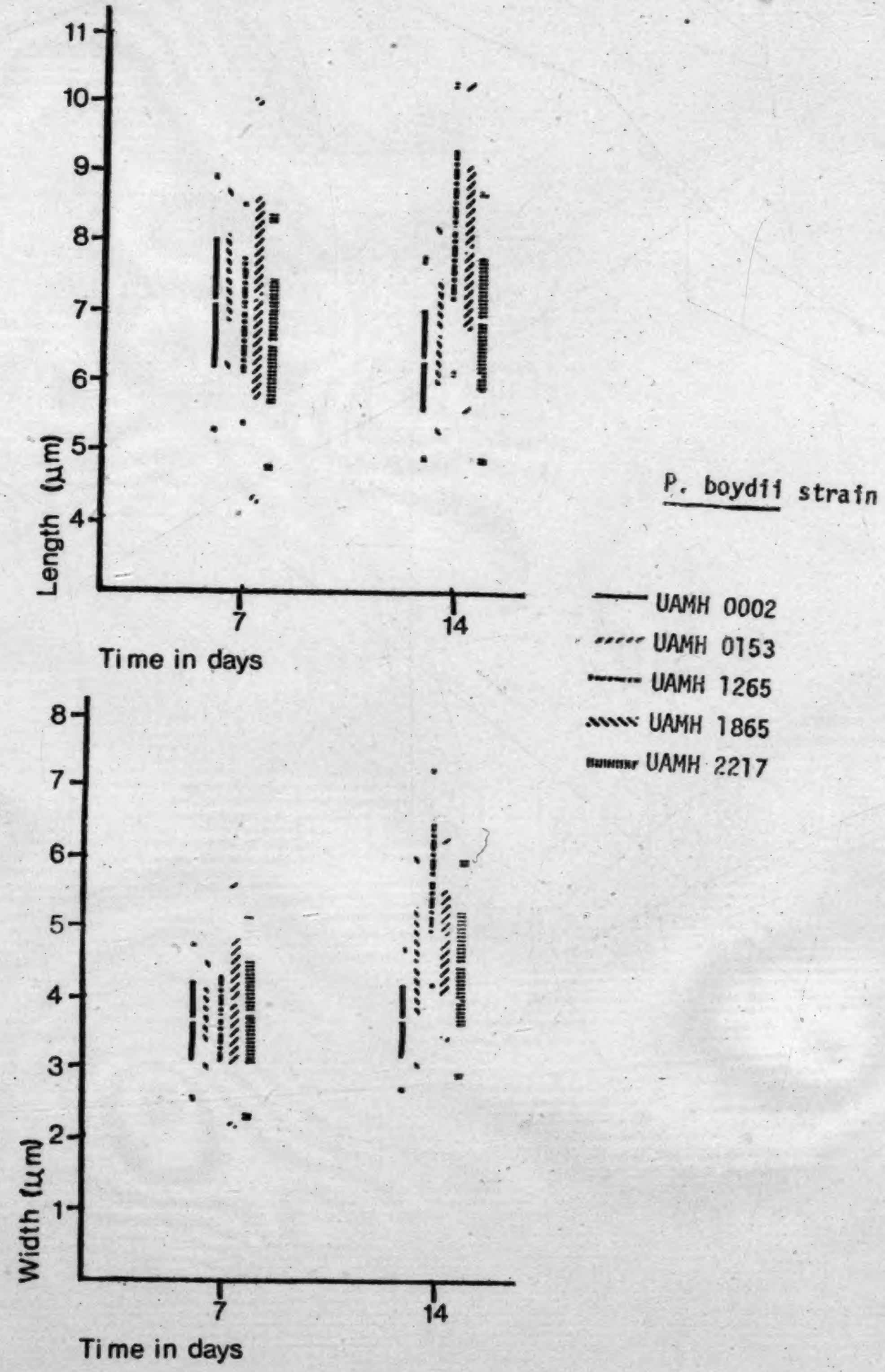


Fig. 5 Conidial measurements after 31 days incubation on Oat. at 18°C, 25°C and 30°C.

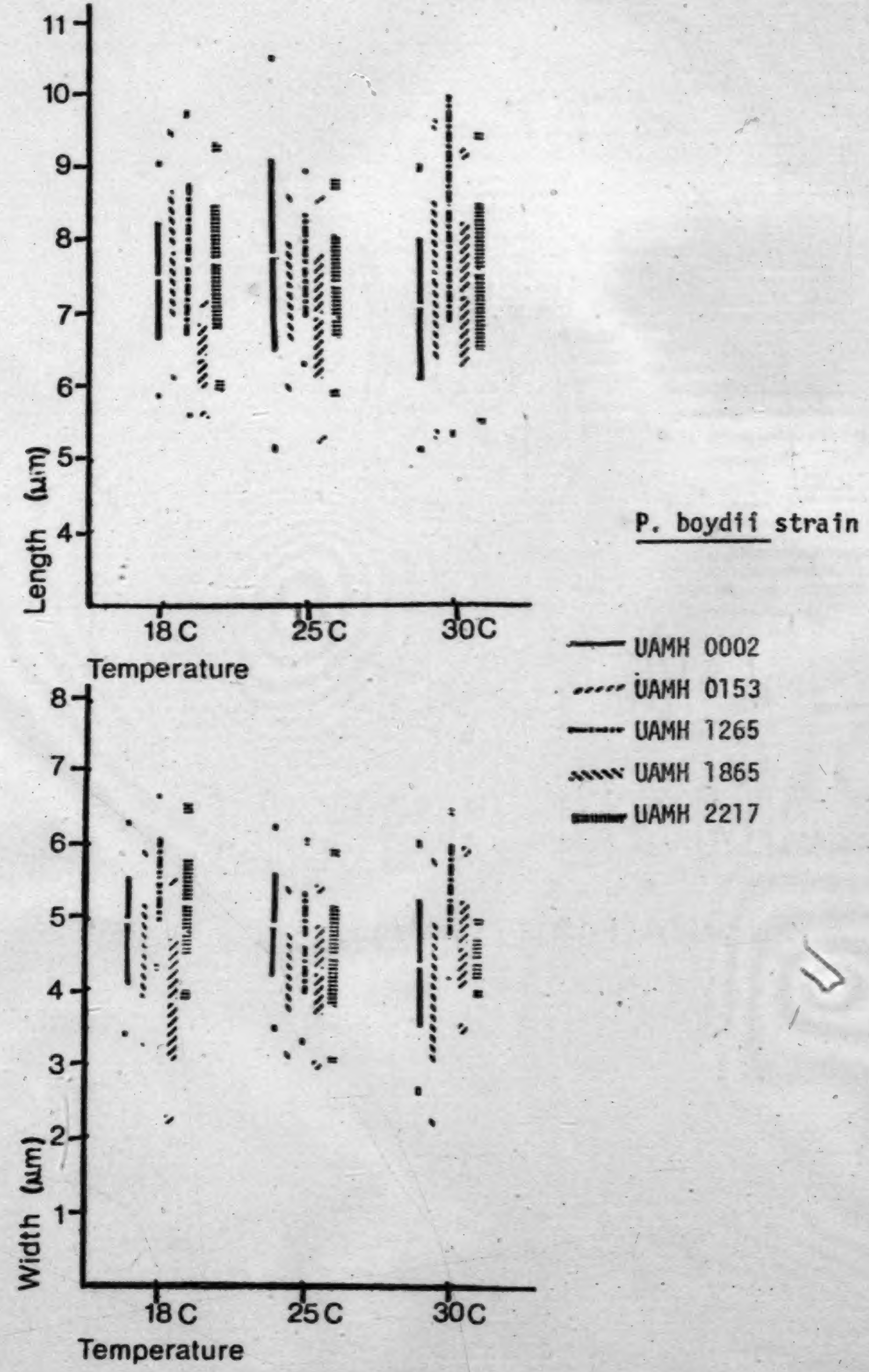


Fig. 6 Ascospore measurements after 31 days incubation on Oat. at 18°C, 25°C and 30°C.

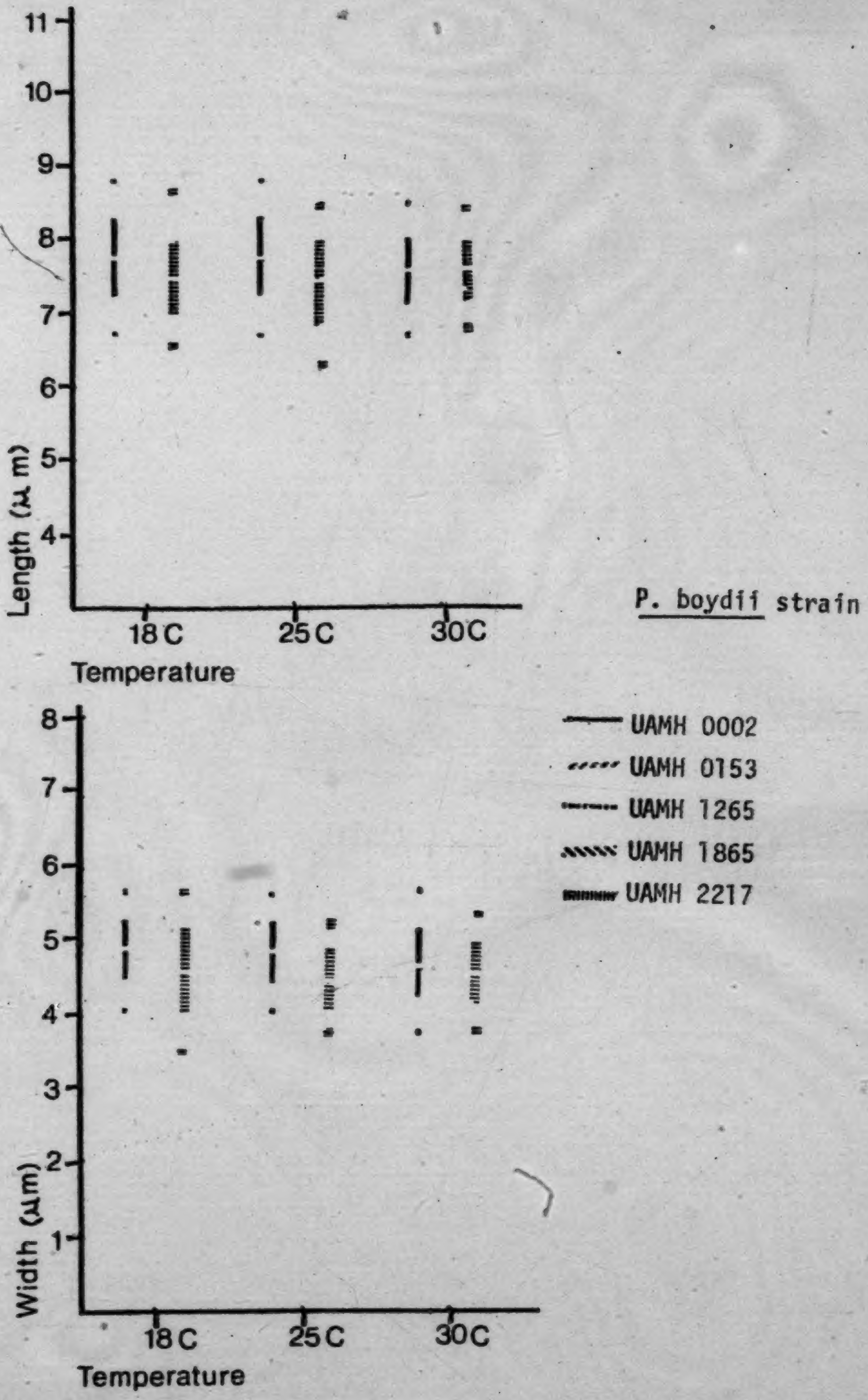


Fig. 7 Conidial measurements after two months incubation on Oat. at 18°C, 25°C and 30°C.

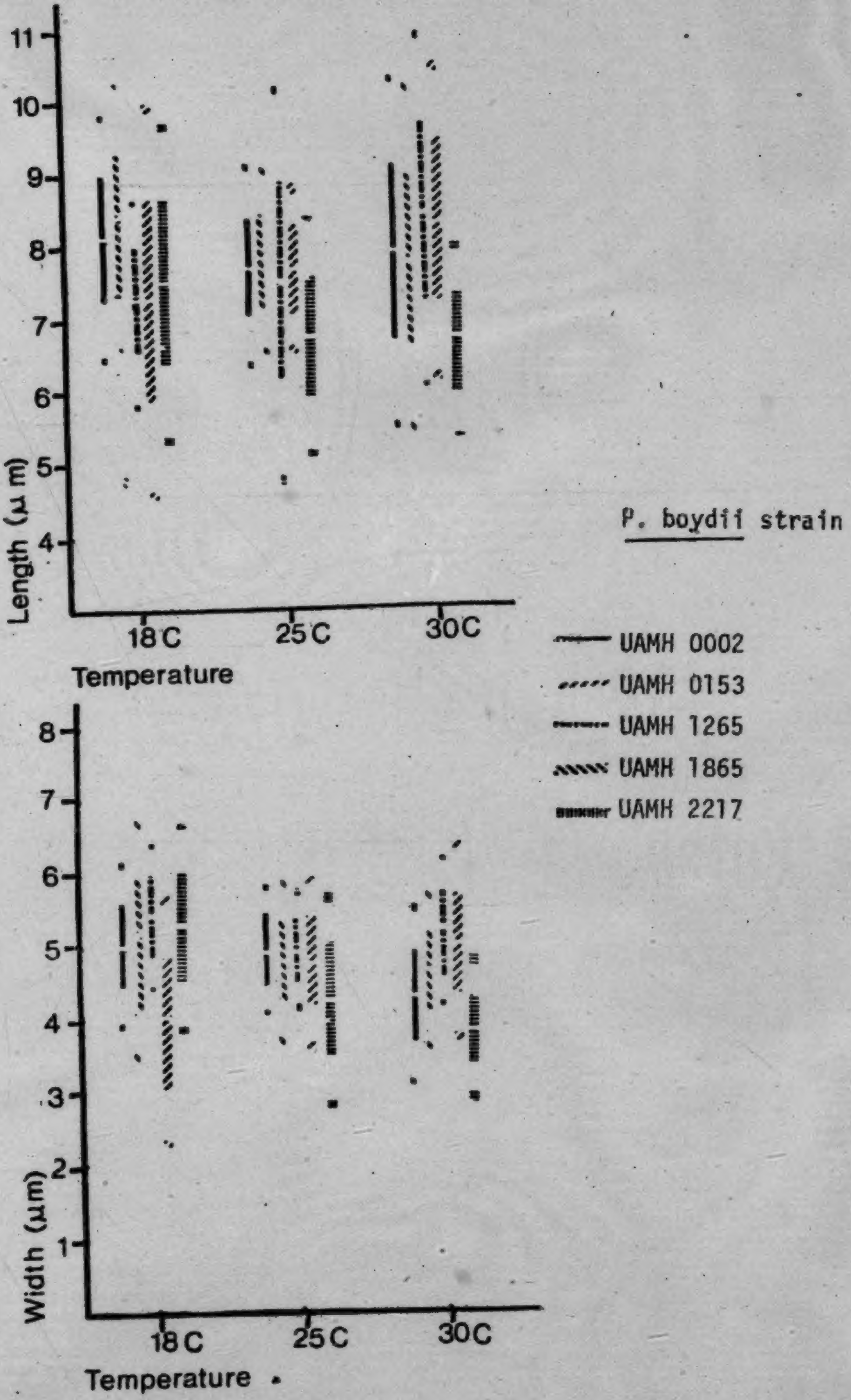


Fig. 8 Ascospore measurements after two months incubation on Oat. at 18°C, 25°C and 30°C.

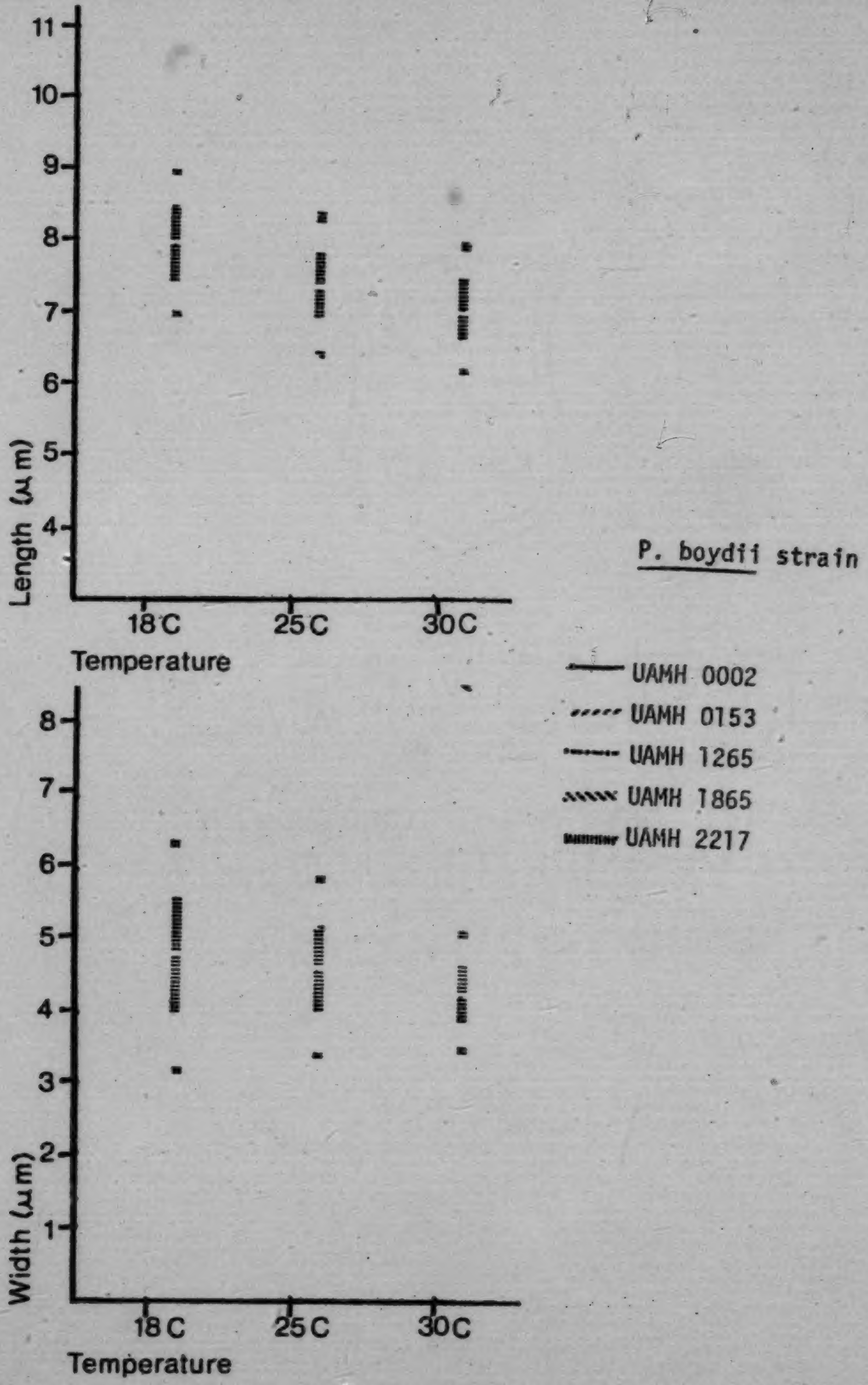


Fig. 9 Conidial measurements after 100 days incubation on Oat. at 18°C, 25°C and 30°C.

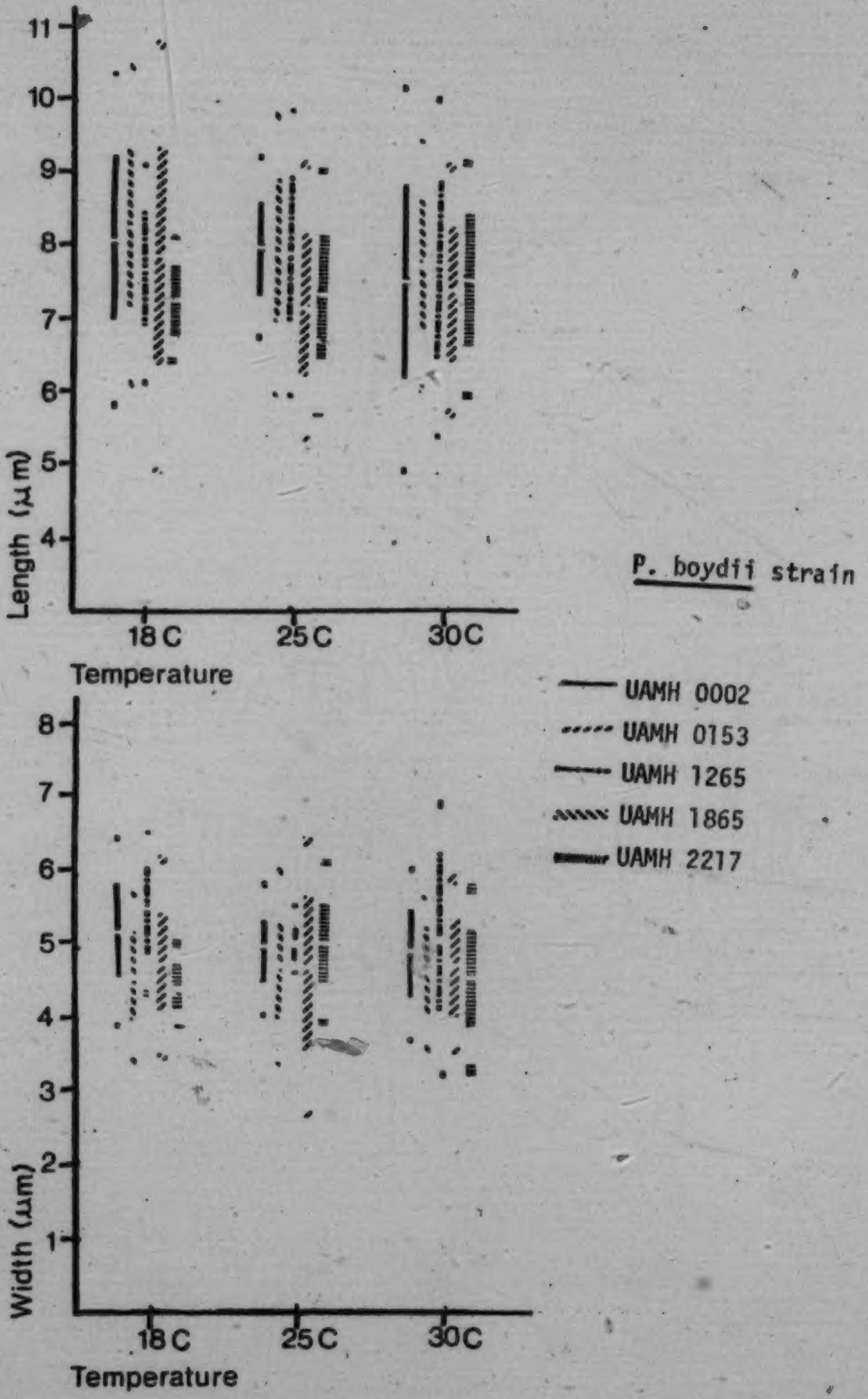
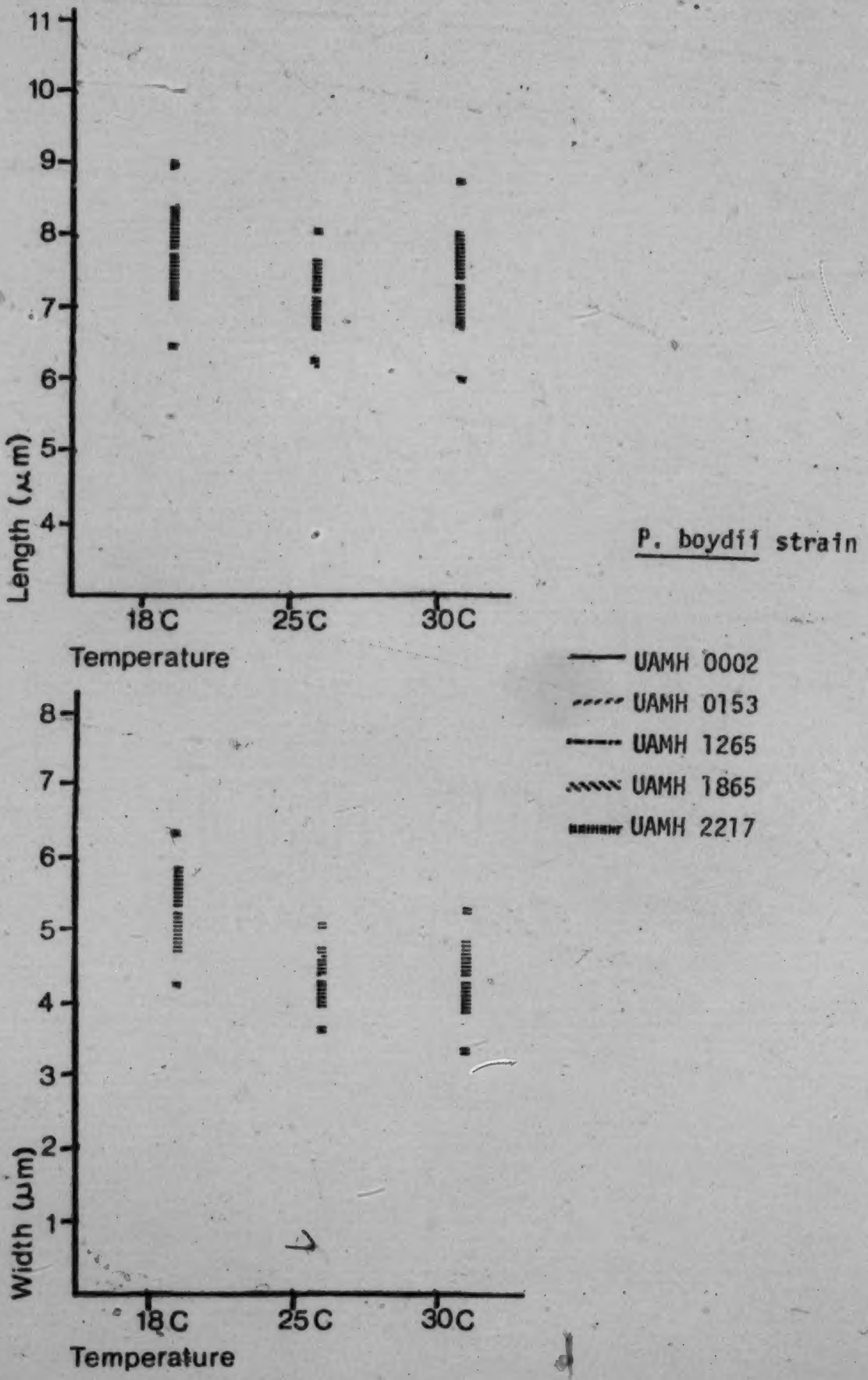


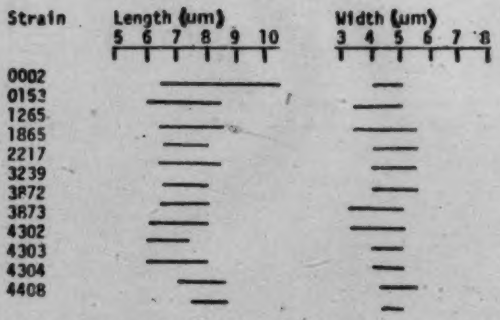
Fig. 10 Ascospore measurements after 100 days incubation on Oat. at 18°C, 25°C and 30°C.



which are not always contained within asci. This may account for part of the variation in ascospore size reported in the literature. Most investigators do not mention the number of ascospores examined to determine size range. Thus inadequate sample size is another possibility for the variation in reported ascospore size. In this study, measurements obtained from scanning electron micrographs were used to confirm the measurements obtained from camera lucida drawings.

As seen in Table 4, both the means and the ranges are quite uniform for all strains except UAMH 0002. In UAMH 0002, the length varied by 4 μm. The intra-strain range is approximately 1 to 1.5 μm in width and 2 μm in length.

Table 4 Ascospore sizes obtained in this study

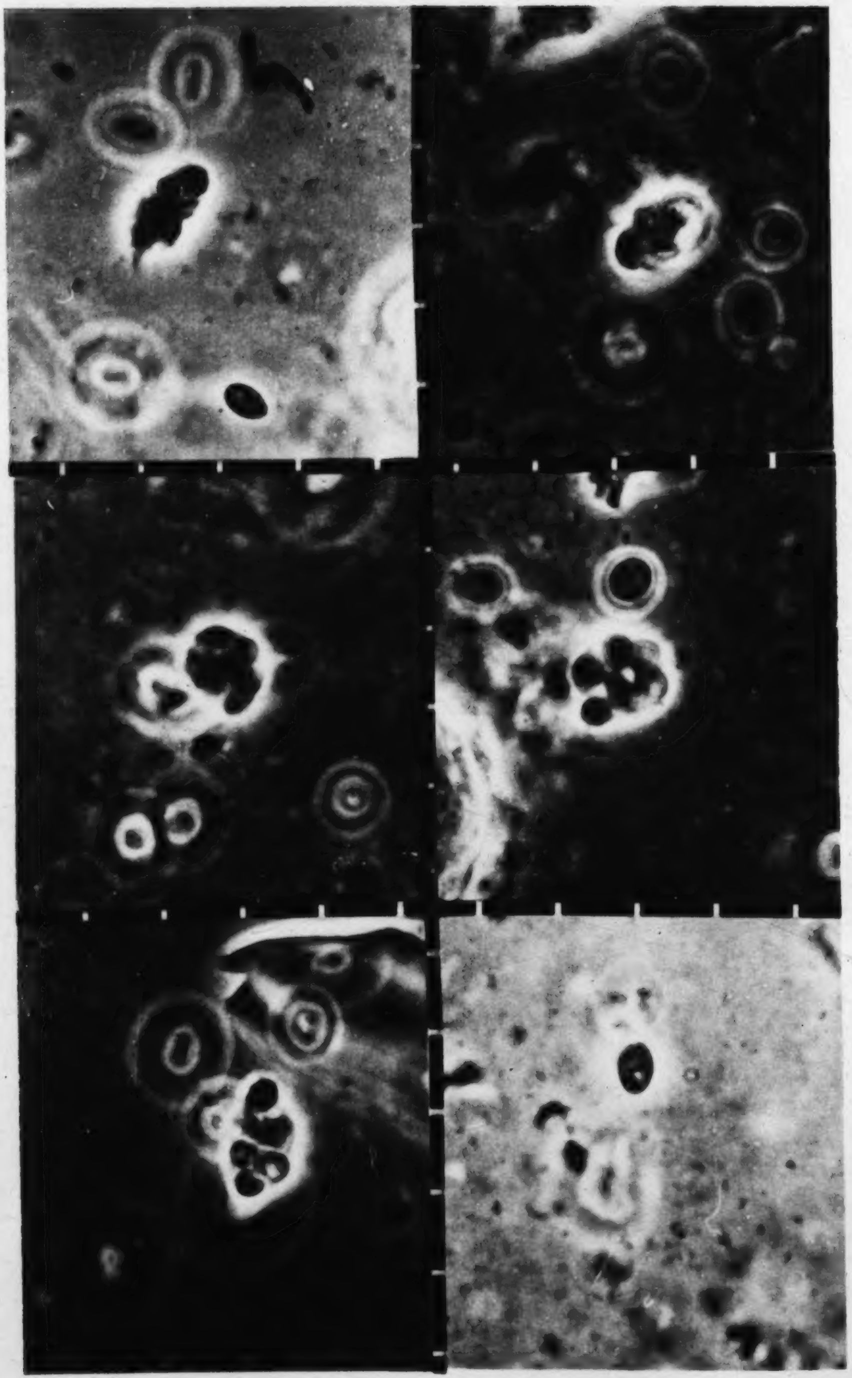


The ascospore size ranges are composites for all media employed.

Plate #1: Immature ascospores

Plate 1 consists of photographs of immature ascospores contained within asci (UAMH 2217). A solitary mature ascospore is shown in the lower right photograph.

(Magnification 1000x)



C. Effects of growth conditions on morphology and spore production

Many investigators have studied nutritional and temperature effects on *P. boydii* (Cazin and Decker 1964, Conti-Diaz 1965) . As Rippon (1974) states in his medical mycology text "Morphology, color, spore production and so forth are all affected by the particular media on which the organism is growing as well as other environmental factors" and he refers to Sabouraud agar as the traditional standard in medical mycology. Therefore Sabouraud medium was included in this study, even though it consistently gave the poorest results. Growth was slow; cleistothecia and coremia were seldom produced, and conidial production for some strains was scant or absent. Oatmeal agar was found to be the best medium for production of the three states. The descriptions of cultural characteristics from four media employed provided a set of standard descriptions on which comparisons could be made.

The culture medium has been shown to affect cleistothecium production (Gordon 1957). This was reflected in this study. Cleistothecium abundance and position, (i. e. submerged in the agar, within the hyphal mat or in the upper layer of hyphae) were seen to vary with the medium used. The most abundant cleistothecium production was found with PYE agar. However the cleistothecia were within the hyphal mat and could not be detected unless the mat was cut to expose the cleistothecia. Also the ascospore maturation rate was considerably slower on this medium, so intact asci were evident for longer periods of time than with the other media.

Temperature was also seen to affect cleistothecium production. On Oatmeal agar, cleistothecia were not produced when incubation was at temperatures of 37°C or higher. The optimum temperature for cleistothecium production ranged from 25°C to 30°C.

All attempts to induce non-cleistothecium producing strains to produce ascocarps failed. (See Materials and Methods for procedures used.)

D. Results of ascospore germination studies

The *Petriellidium* and *Petriella* ascospores germinated from only one end of the ascospore. *Petriellidium fimeti* was the only exception, germinating from both germ pores. The significance for classification is not known.

E. Viral studies

The electron microscopic study of *P. boydii* strain UAMH 2324 for viral particles did not yield conclusive results. An unusual formation within the cells was found (Plate 2). A dense mass of compact granular material at times quite large, almost filling the cell was seen. It is not known whether this mass represents a proviral state or is some component of the fungus. No further attempts were made to determine its nature. Viral infections of Ascomycetes have been described (Bozarth 1979, Weber 1979).

Plate #2: Viral Studies by Electron Microscopy

a-control cell of *P. boydii* UAMH 0002

b,c-two UAMH 2324 cells containing dense granules (arrow)

d-a magnification of one of the cells shown in b

1μ
1μ

F. Results: Strain descriptions

The strains examined in this study are described in this section by a standardized description form and plate of photographs for each strain. The description indicates first the species name (as finally identified in this study), the UAMH number and information of its source, isolator and original identification as well as the date received by the UAMH Culture Collection. Pictorial descriptions are given for colony growth at four (magnification 16x) and 28 days (magnification .9x). Written descriptions are given to describe the colony colour and reverse. The growth rates on the four media and on Oat. at different temperatures are represented as graphs. The microscopic characters are represented by pictures and measurements. Not all strains previously producing ascospores produced the ascocarpic state during this survey. As a result, the SEM photographs for these strains and, in a few cases ascocarp measurements are absent. Comments, if necessary, are included to further describe the strain. These descriptions also serve as legends for the plates.

Plate #3: *Petriellidium boydii* UAMH 0002

Isolated from mycetoma, leg, Edmonton, 1934 by E. S. Dowding

Entered 1954 as *Allescheria boydii*

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        1) Oat- Lt. mouse brown/light(mod. dark)
        2) Cer- Dark mouse brown/none
        3) PYE- Mod. mouse brown/dark gold-green
        4) Sab- Lt. mouse brown/pale cream green
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6-9.5 x 3.5-6 µm — Figs. N,R
    - b. Synnematous conidia- 4.5-8 x 2-3 µm — Figs. O,S
    - c. Ascocarps- 77-111.5 µm dia. — Figs. P,U
    - d. Ascospores- 6.5-10.5 x 4-5.5 µm,golden — Figs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* strain.

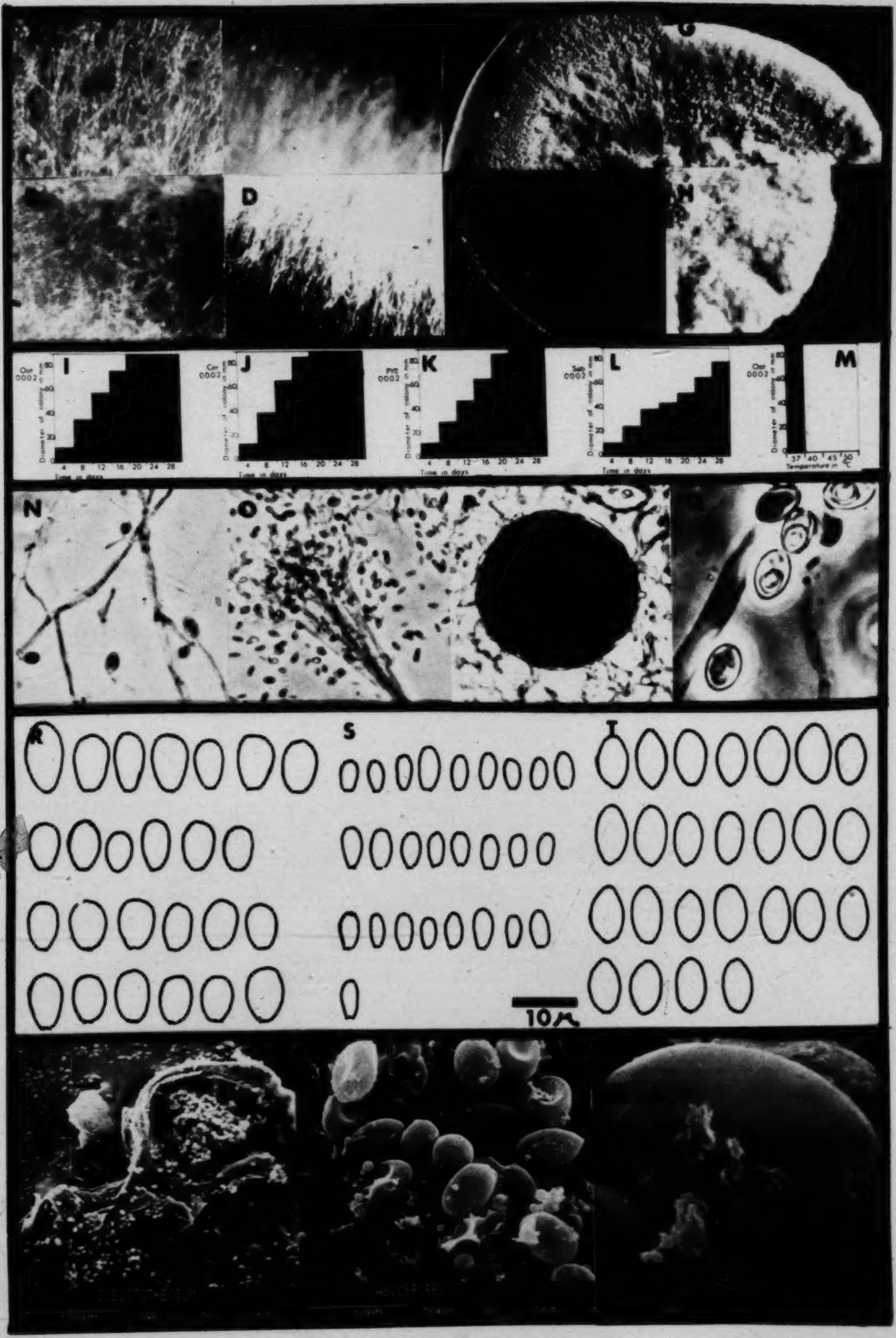

G
D
H
I
Oat
0002
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer
0002
K
PYE
0002
L
Sab
0002
M
Oat
0002
37
40
45
50
Temperature in °C
N
O
R
S
T
10μ

Plate #4: *Petriellidium boydii* UAMH 0153

Isolated 1947 by Conant

Received 1954 from Conant as *Graphium*

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Mod. mouse brown-gray/mod dark
     - 2) Cer- Lt. mouse brown/none
     - 3) PYE- Lt. mouse brown-flesh/mod yellow green
     - 4) Sab- Lt. tan/pale cream green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6-9.5 x 3.5-6 μm — Figs. N,R
   - b. Synnematous conidia- 4.5-8 x 1.5-3 μm — Figs. O,S
   - c. Ascocarps- 55.5-86 μm dia. — Figs. P,U
   - d. Ascospores- 6-8.5 x 3.5-5 μm,golden — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* strain.

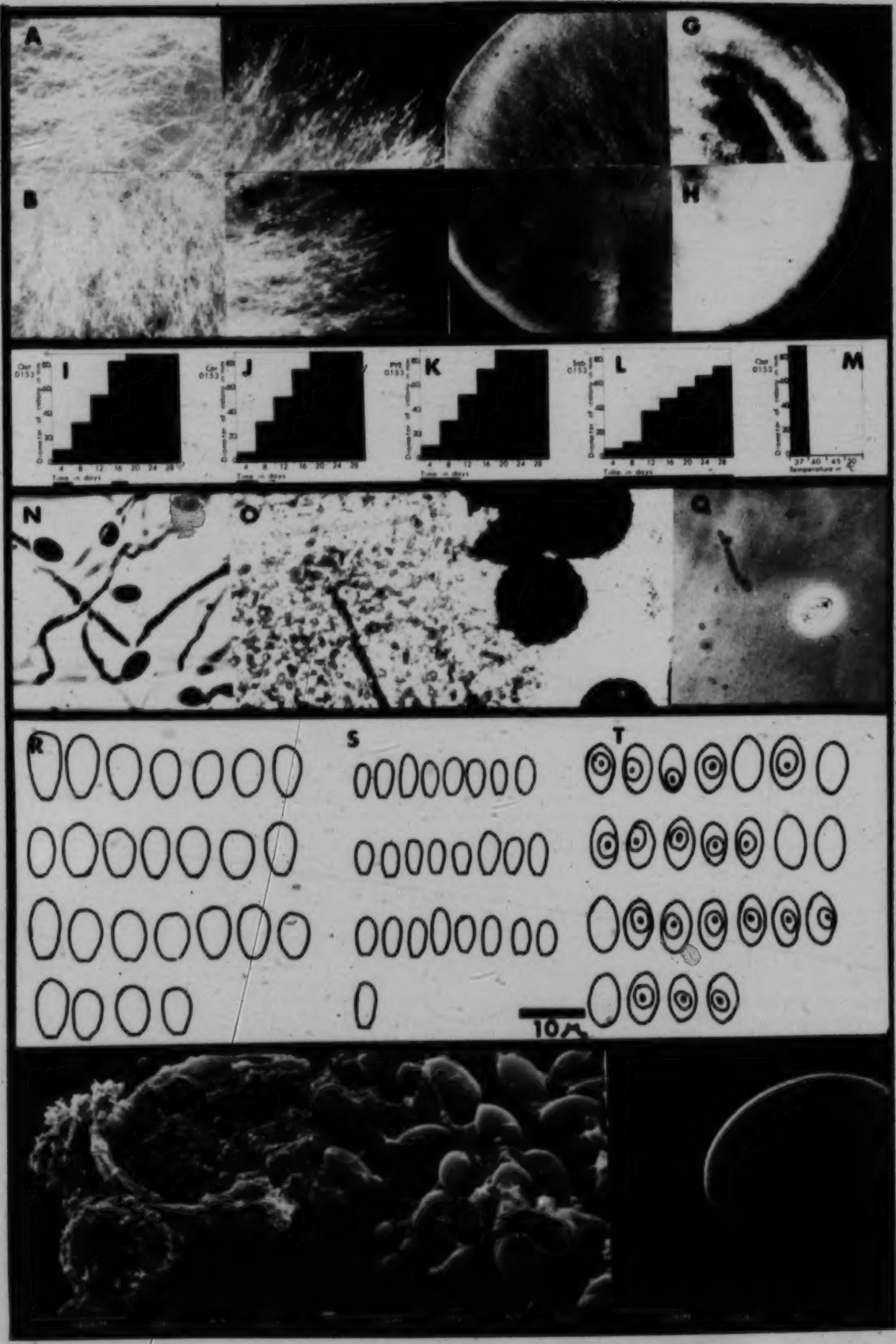

A
B
G
H
I
J
K
L
M
Czr 0153
Diameter of colony
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
Temperature in °C
37
40
45
50
N
O
Q
R
S
T
10µ

Plate #5: *Petriellidium boydii* UAMH 0800

Isolated by Ciferri

Received 1960 from CBS as *Glenospora graphii* strain Ciferri

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. camel/dark
        - 2) Cer- Lt. mouse brown/greenish
        - 3) PYE- Lt. mouse brown/gold-lt. brown
        - 4) Sab- Lt. mouse-brown/dark brown
2. **Growth Rates**
    - a. at 25°C on different media Figs. I-L
    - b. at different temperatures on Oat Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6-9.5 x 3.5-5 um Figs. N,R
    - b. Synnematous conidia- not seen Figs. O,S
    - c. Ascocarps- not seen Figs. P,U
    - d. Ascospores- not seen Figs. Q,T,V,W
4. **Comments**

Although this strain was originally identified as *Glenospora graphii*, it now produces only the *Scedosporium* state. This is a typical *P. boydii* anamorph.

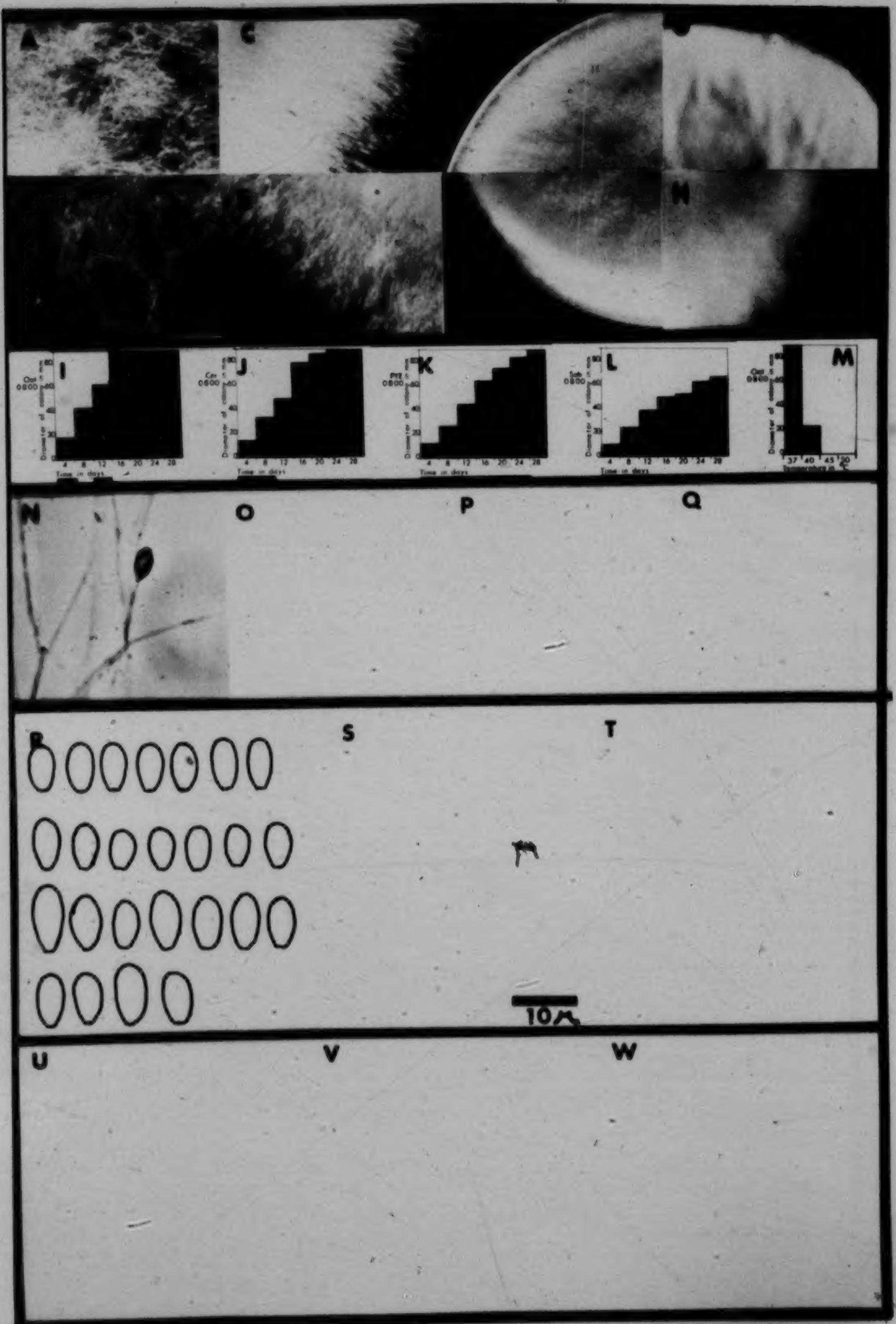

A
C
H
I
Oat
0800
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer
0800
Time in days
K
PYE
0800
Time in days
L
Sab
0800
Time in days
M
Oat
0800
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10μ
U
V
W

Plate #6: *Petriellidium boydii* UAMH 1099

Isolated from mycetoma, California, by G. F. Orr

Received 1961 from Orr as *Allesheria boydii* UCLAB-M-55

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Mod. mouse brown/dark
     - 2) Cer- Lt. mouse brown/greenish
     - 3) PYE- Mod. mouse brown/dark olive-green
     - 4) Sab- Mod. grey/deep blue to dark green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6-10 x 3.5-5.5 um — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

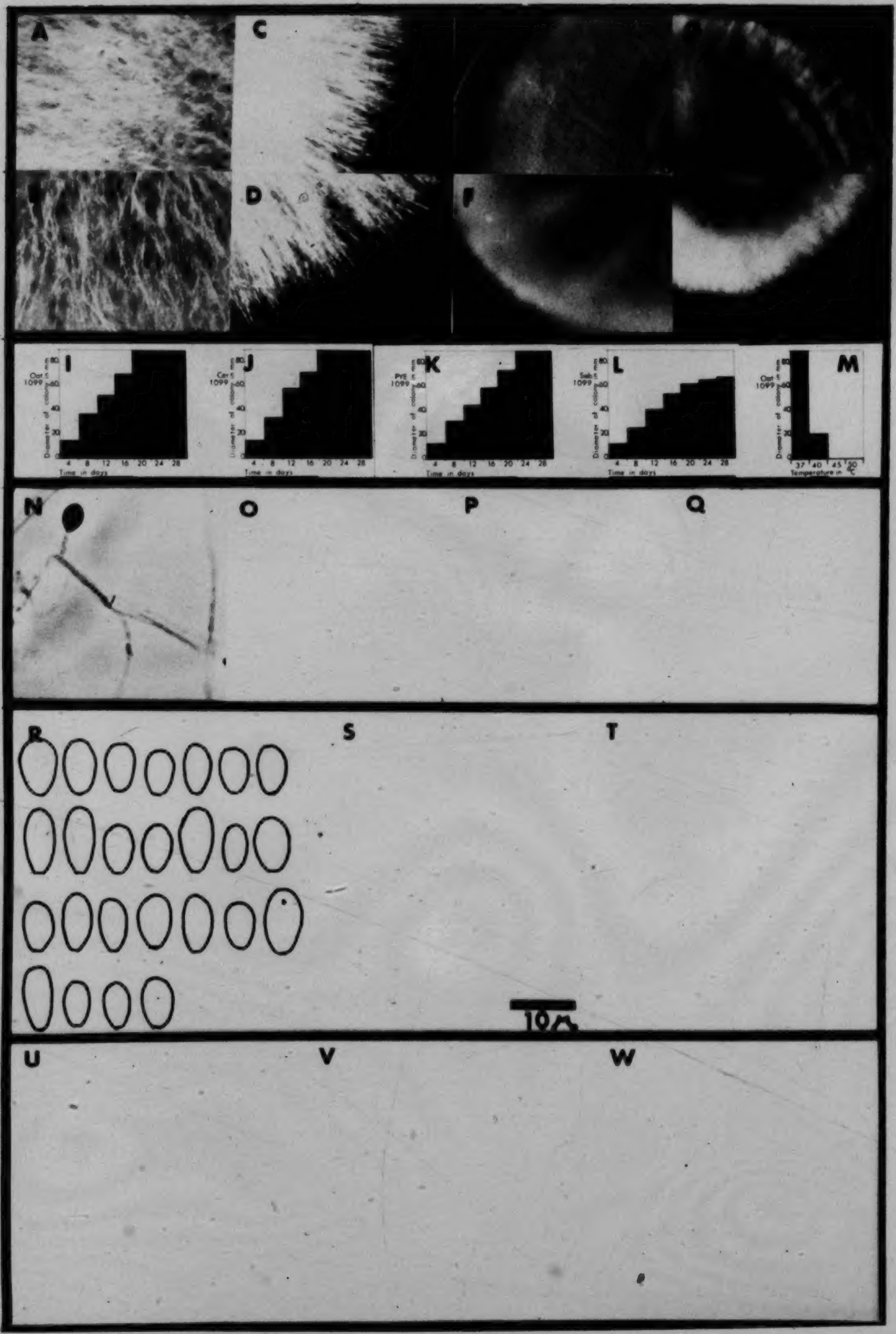

A
C
D
F
I
J
K
L
M
Oat
Corn
PYE
Sab
1099
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10µ
U
V
W

Plate #7: *Petriellidium boydii* UAMH 1265

Isolated from ear canal, chronic otitis media, Edmonton, 1962 by J. W. Carmichael

Entered 1962 as *Allescheria boydii* P62-1582,

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Off white/light
        - 2) Cer- Lt. mouse brown/none
        - 3) PYE- Mod. mouse brown/gold-tan
        - 4) Sab- Lt. mouse brown-grey/cream-pale green
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6-9.5 x 3.5-5 *u*m — Figs. N,R
    - b. Synnematous conidia- 4.5-7.5 x 2-3 *u*m — Figs. O,S
    - c. Ascocarps- 98-145.5 *u*m dia. — Figs. P,U
    - d. Ascospores- 6.5-8.5 x 3.5-5.5 *u*m,goldenFigs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* strain.

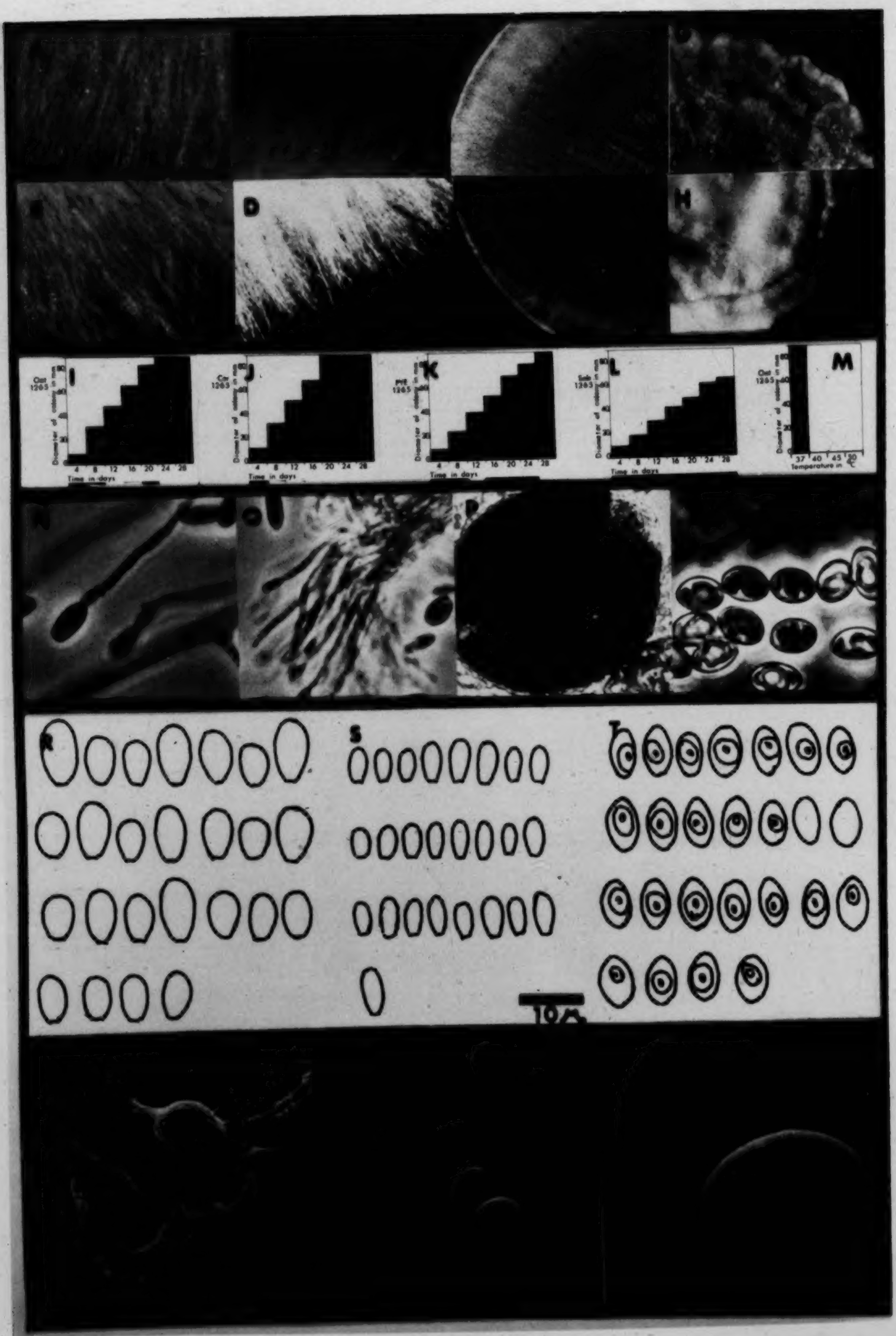

D
H
I
J
K
L
M
Oat 1265
Cm 1265
PYE 1265
Sab 1265
Oat 1265
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
O
P
R
S
T
10μ

Plate #8: *Petriellidium boydii* UAMH 1865

Isolated by G. F. Orr

Received 1963 from Orr as *Didymostilbe* PV1

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        1) Oat- Off white/light
        2) Cer- Lt. mouse brown/none
        3) PYE- Off white/yellow
        4) Sab- Off white/cream
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6-10 x 3.5-6 um — Figs. N,R
    - b. Synnematous conidia- 4.5-7.5 x 2-3 um — Figs. O,S
    - c. Ascocarps- 103 um dia. — Figs. P,U
    - d. Ascospores- 6.5-8.0 x 4-5.5 um,golden — Figs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* strain.

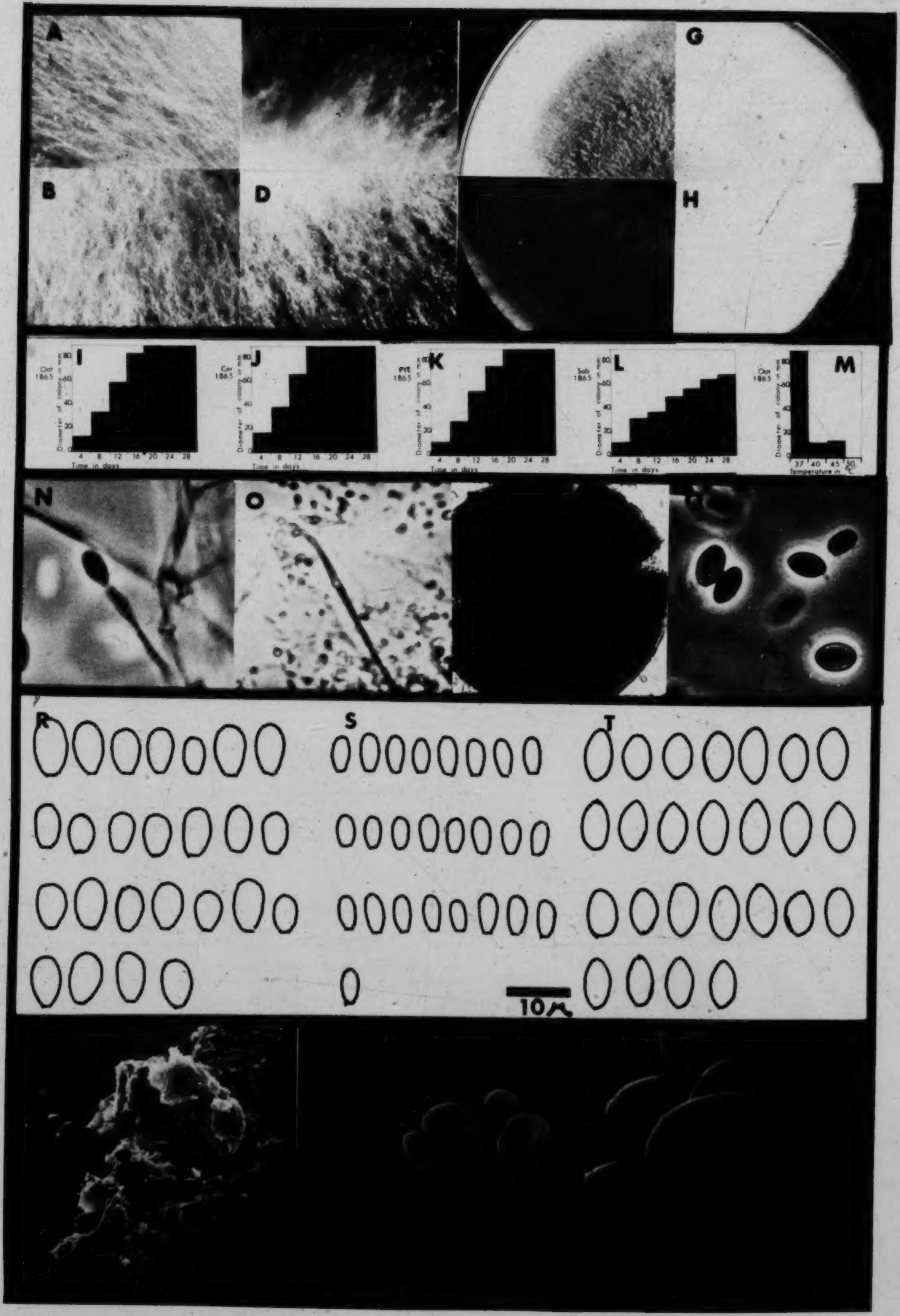

A
B
D
G
H
I
Oat 1865
J
Cor 1865
K
PYE 1865
L
Sab 1865
M
Oat 1865
Diameter of colony in mm
0
20
40
60
80
Time in days
4
8
12
16
20
24
28
Temperature in °C
37
40
45
50
N
O
R
S
T
10μ

Plate #9: *Petriellidium boydii* UAMH 2217

Isolated from right ear, Edmonton, 1964 by J. W. Carmichael

Entered 1964 as *Allescheria boydii* My2820-64

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Mod. mouse brown/mod. dark
        - 2) Cer- Lt. mouse brown/none
        - 3) PYE- Mod. mouse brown/dark gold
        - 4) Sab- Off white/pale yellow green
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5.5-8.5 x 3.5-5.5 *u*m — Figs. N,R
    - b. Synnematous conidia- 4-7 x 2-2.5 *u*m — Figs. O,S
    - c. Ascocarps- 101-155.5 *u*m dia. — Figs. P,U
    - d. Ascospores- 6.5-8.5 x 4-5.5 *u*m,golden — Figs. Q,T,V,W
4. **Comments**

This is a typical *P. boydii* strain.

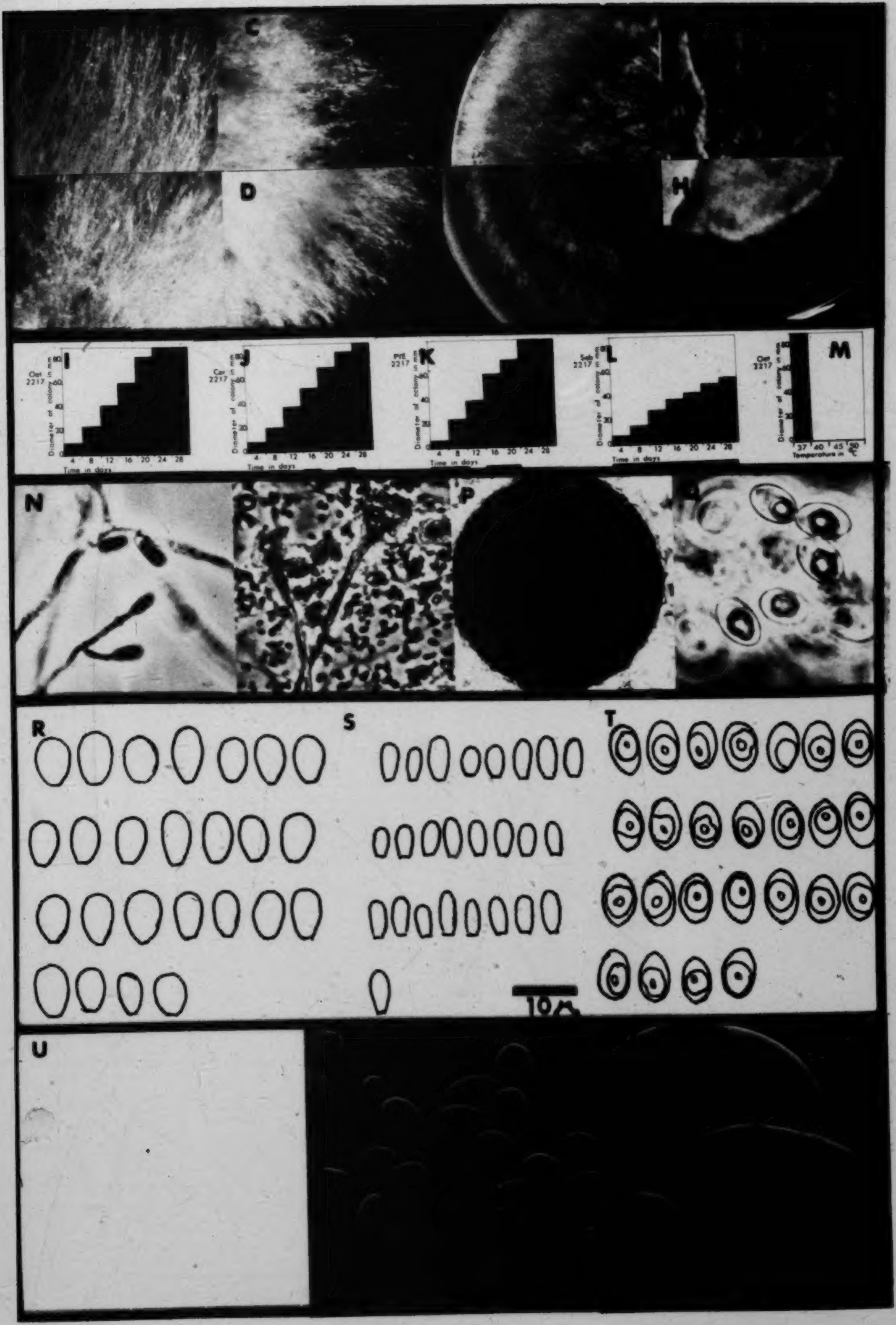

C
D
H
I
Oat
2217
J
Cer
2217
K
PYE
2217
L
Sab
2217
M
Oat
2217
Diameter of colony in mm
0
20
40
60
80
Time in days
4
8
12
16
20
24
28
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10μ
U

Plate #10: *Petriellidium boydii* UAMH 2324

Isolated from mycetoma, Venezuela, 1922 by D. Borelli

Received 1965 from Borelli as *Monosporium apiospermum*

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Clear/none
        - 2) Cer- Clear/none
        - 3) PYE- White/cream
        - 4) Sab- Pale cream gold/pale cream gold
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5-8 x 3-5 *u*m — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

This strain has a "sick" appearance, aerial hyphae are seldom produced.

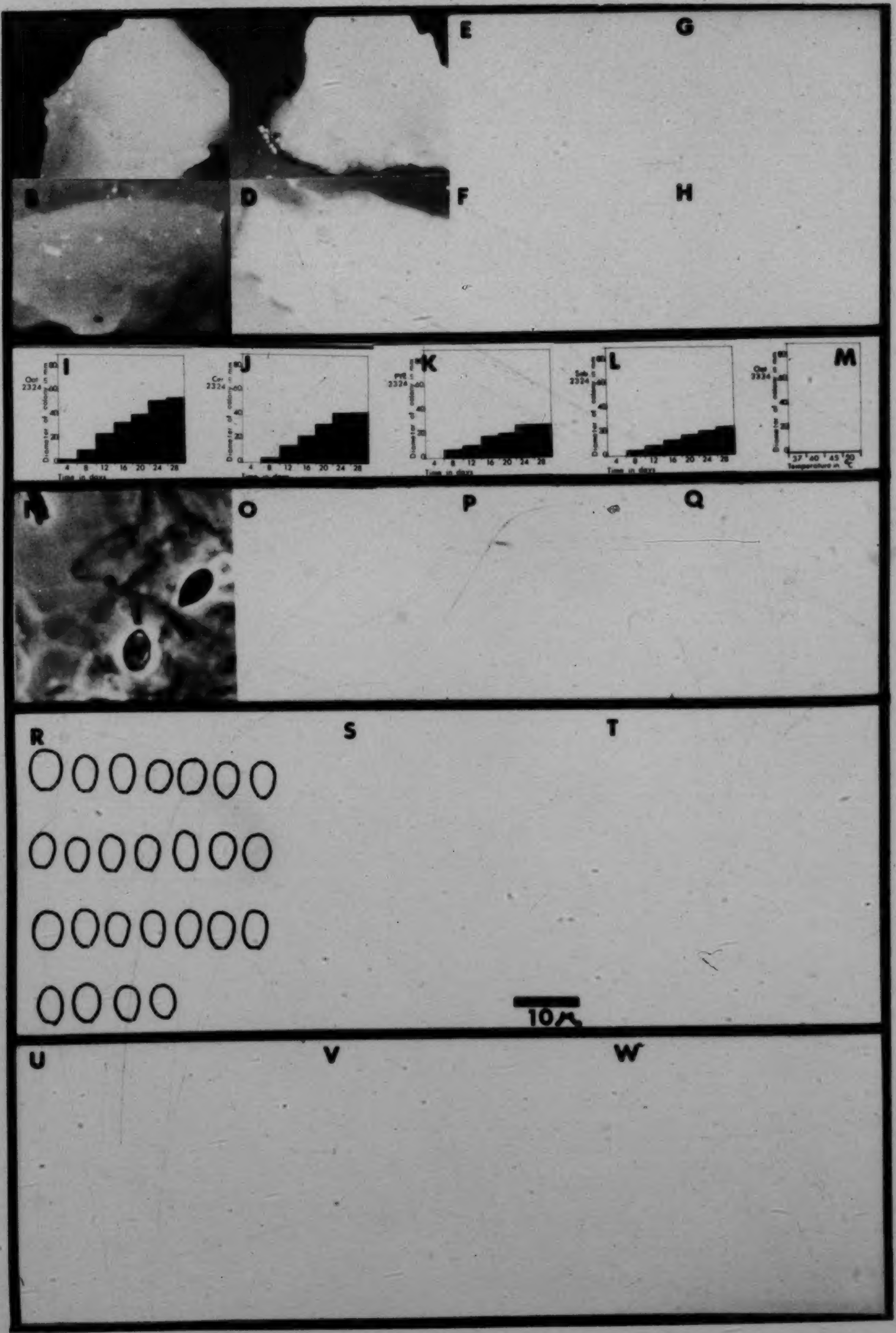

B
D
E
F
G
H
I
Oat 2324
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cor 2324
K
PYE 2324
L
Sab 2324
M
Oat 2324
37
40
45
20
Temperature in °C
O
P
Q
R
S
T
10μ
U
V
W

Plate #11: *Petriellidium boydii* UAMH 2507

Isolated 1963 by G. F. Orr

Received 1965 from Orr as *Chrysosporium species* O-3024

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. mouse brown(lt. grey)/mod. dark
        - 2) Cer- Off white/none
        - 3) PYE- Off white/mod. cream green
        - 4) Sab- Off white/mod. yellow with lt. brown(cream lt. tan)
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5.5-9 x 3.5-5.5 um — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* anamorph.

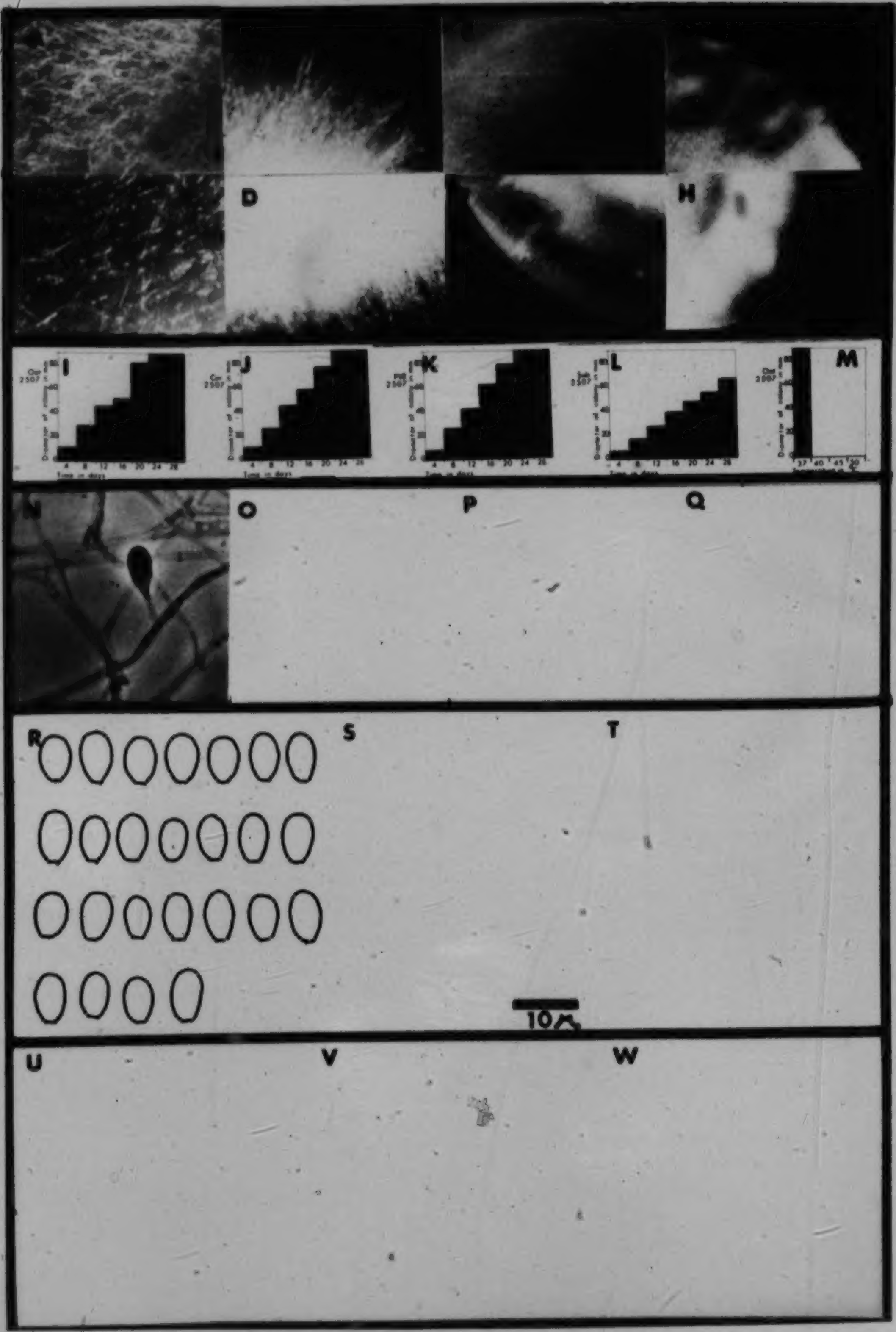

D
H
I
J
K
L
M
Car 2507
Car 2507
Pig 2507
Sab 2507
Car 2507
Diameter of colony mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
N
O
P
Q
R
S
T
10 µ
U
V
W

Plate #12: *Petriellidium boydii* UAMH 2975

Isolated from bronchial washings, Alberta, 1968 by J. W. Carmichael

Entered 1968 as *Allescheria boydii* My 2632

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Mod. olive green/light
     - 2) Cer- Lt. mouse brown/none
     - 3) PYE- Lt. mouse brown(dark mouse brown)/gold yellow
     - 4) Sab- Lt. mouse brown/mod. olive green(cream green)
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6.5-10.5 x 3.5-5.5 um — Figs. N,R
   - b. Synnematous conidia- 6.5-13.5 x 2.5-4.5 um — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

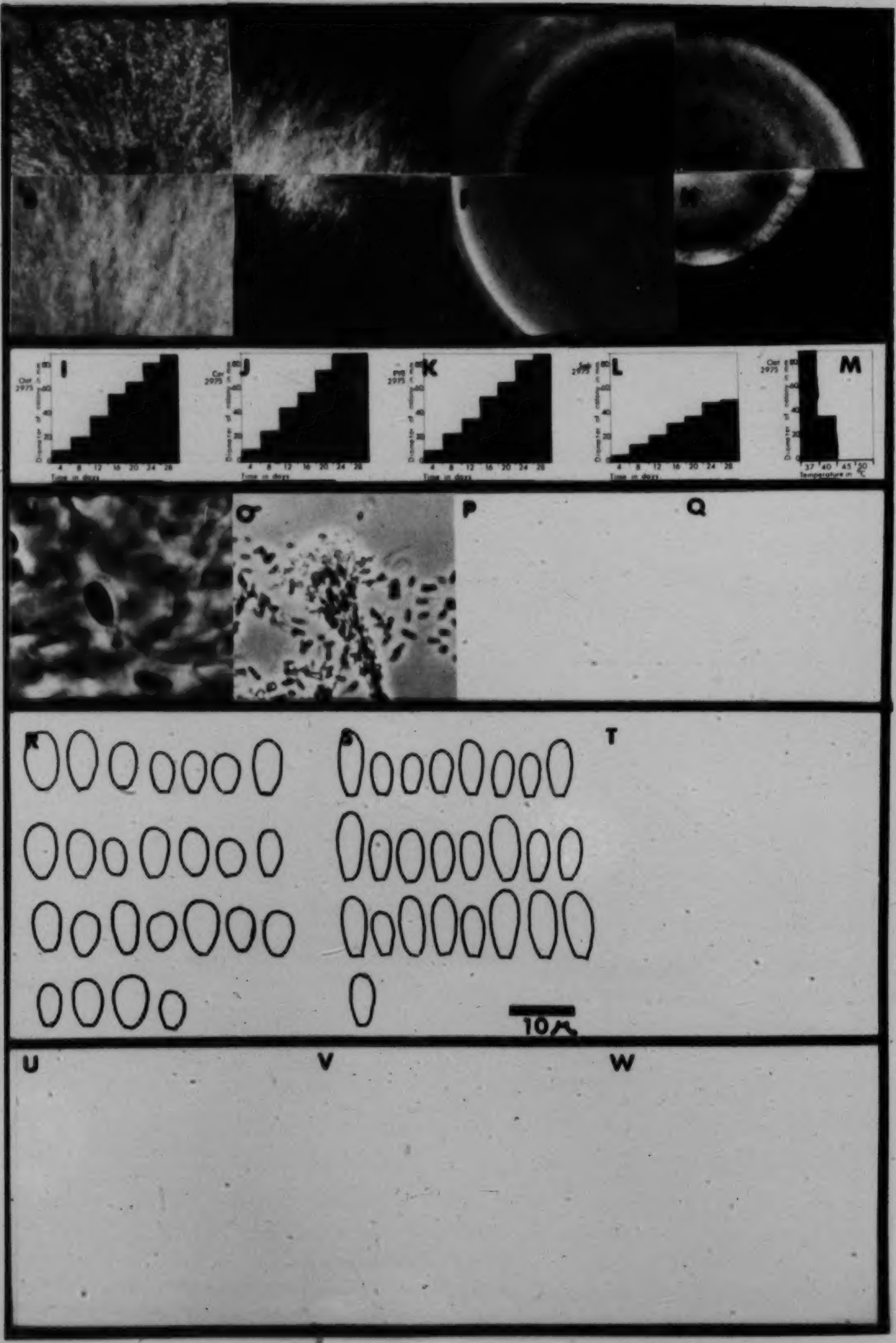

I
J
K
L
M
Oat 2975
Cor 2975
Sab 2975
Oat 2975
Diameter of colony in mm
0
20
40
60
80
Time in days
4
8
12
16
20
24
28
37
40
45
50
Temperature in °C
O
P
Q
R
S
T
10µ
U
V
W

Plate #13: *Petriellidium boydii* UAMH 3230

Isolated from turkey corrals (litter), Ontario, California, 1969 by J. W. Carmichael

Entered 1969 as synnematous fungus

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. grey/dark
        - 2) Cer- Lt. mouse brown(lt. grey)/greenish
        - 3) PYE- Lt. mouse brown(mod. mouse brown)/gold tan
        - 4) Sab- Off white/dark yellow-green
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5.5-8.5 x 3-5 µm — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

This is a typical *P. boydii* anamorph.

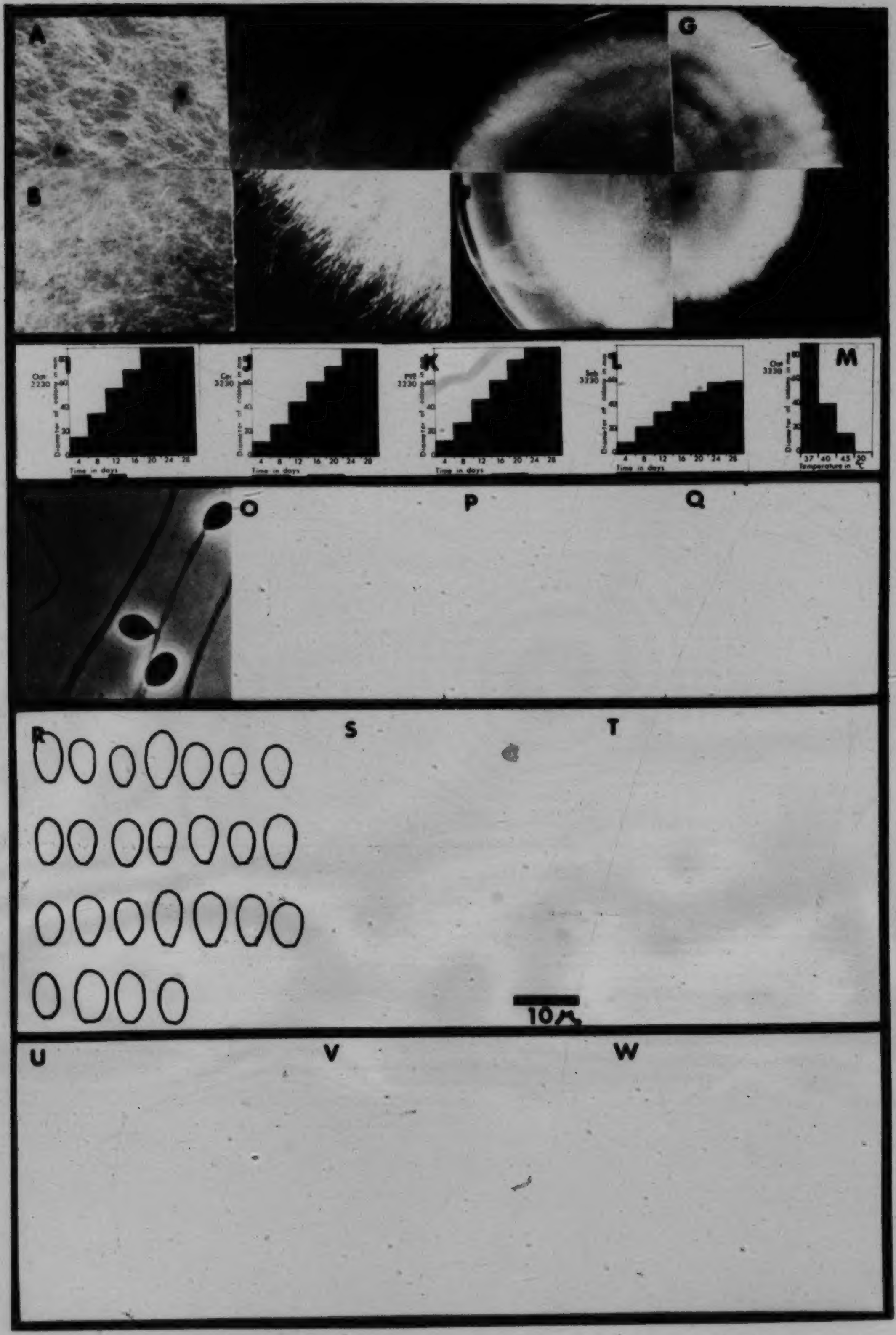

A
B
G
I
Oa
3230
Diameter of colony in mm
Time in days
J
Cor
3230
K
PYE
3230
L
Sab
3230
M
Temperature in °C
0
20
40
60
80
4
8
12
16
20
24
28
37
40
45
50
O
P
Q
R
S
T
10 μ
U
V
W

Plate #14: *Petriellidium boydii* UAMH 3239

Isolated from under chicken pens, Ontario, California, 1969 by J. W. Carmichael

Entered 1969 as *Stilbaceae* 53-10-6

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Mod. mouse brown/mod. dark
        - 2) Cer- Mod. mouse brown/none
        - 3) PYE- Lt mouse brown-grey/pale yellow green
        - 4) Sab- Off white/cream
2. **Growth Rates**
    - a. at 25°C on different media Figs. I-L
    - b. at different temperatures on Oat Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6.5-9.5 x 3.5-5.5 *u*m Figs. N,R
    - b. Synnematous conidia- not seen Figs. O,S
    - c. Ascocarps- 66.5-99.5 *u*m dia. Figs. P,U
    - d. Ascospores- 6.5-8 x 4-5.5 *u*m,golden Figs. Q,T,V,W
4. **Comments**

This is a typical *P. boydii* anamorph.

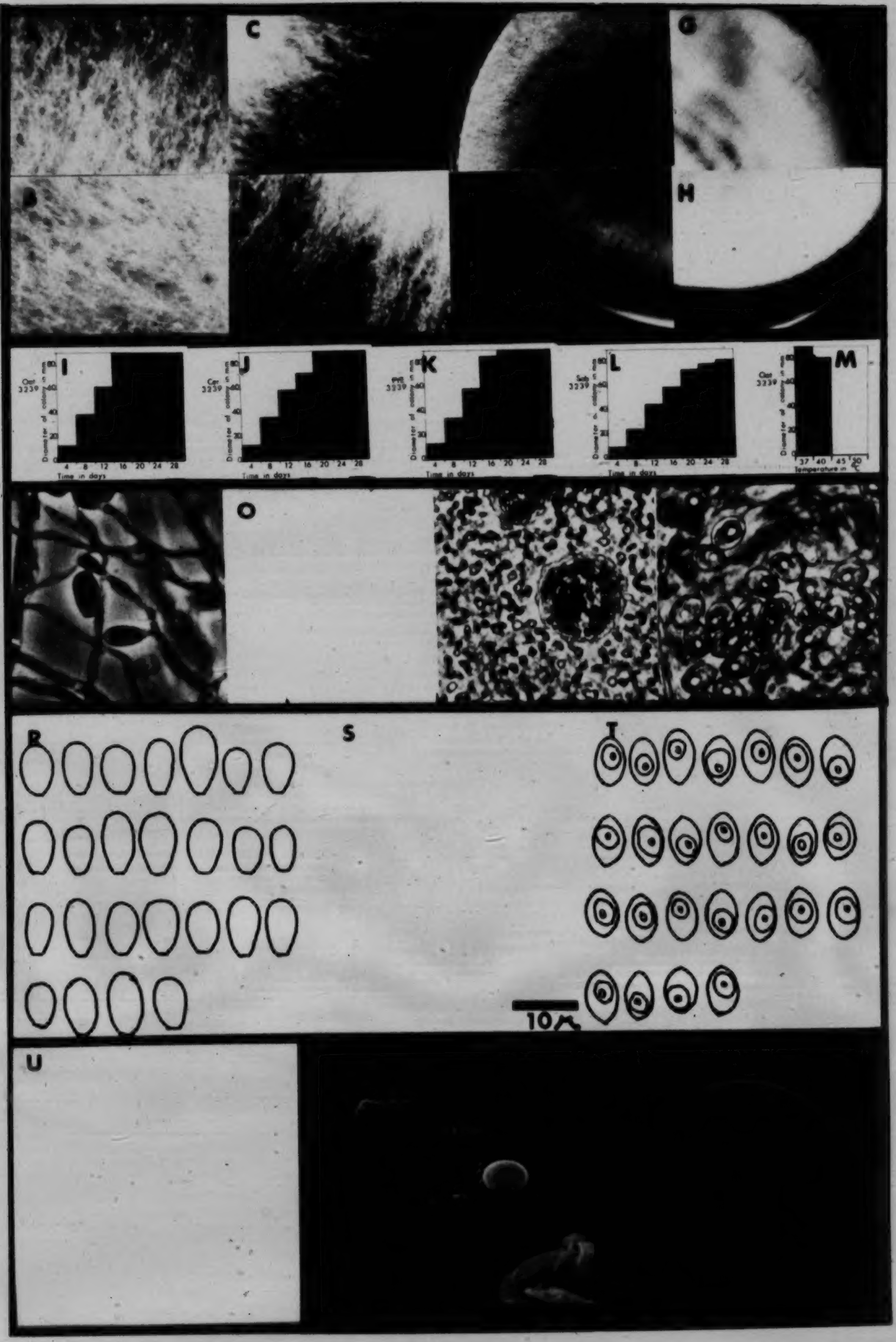

C
G
D
H
I
J
K
L
M
Oat 3239
Cer 3239
PR 3239
Sab 3239
Oat 3239
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
O
R
S
T
10 µ
U

Plate #15: *Petriellidium boydii* UAMH 3746

Isolated from manure, Lethbridge, 1974 by R. G. Bell
Received 1974 from Bell as *Chrysosporium species* 25M

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Mod. mouse brown/dark
     - 2) Cer- Mod. mouse brown/none
     - 3) PYE- Mod. mouse brown(dark mouse brown)/yellow(cream green)
     - 4) Sab- Mod. mouse brown-grey(lt.)/pale cream green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 5.5-8 x 3.5-5 *u*m — Figs. N,R
   - b. Synnematous conidia- 5-8.5 x 2-3 *u*m — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

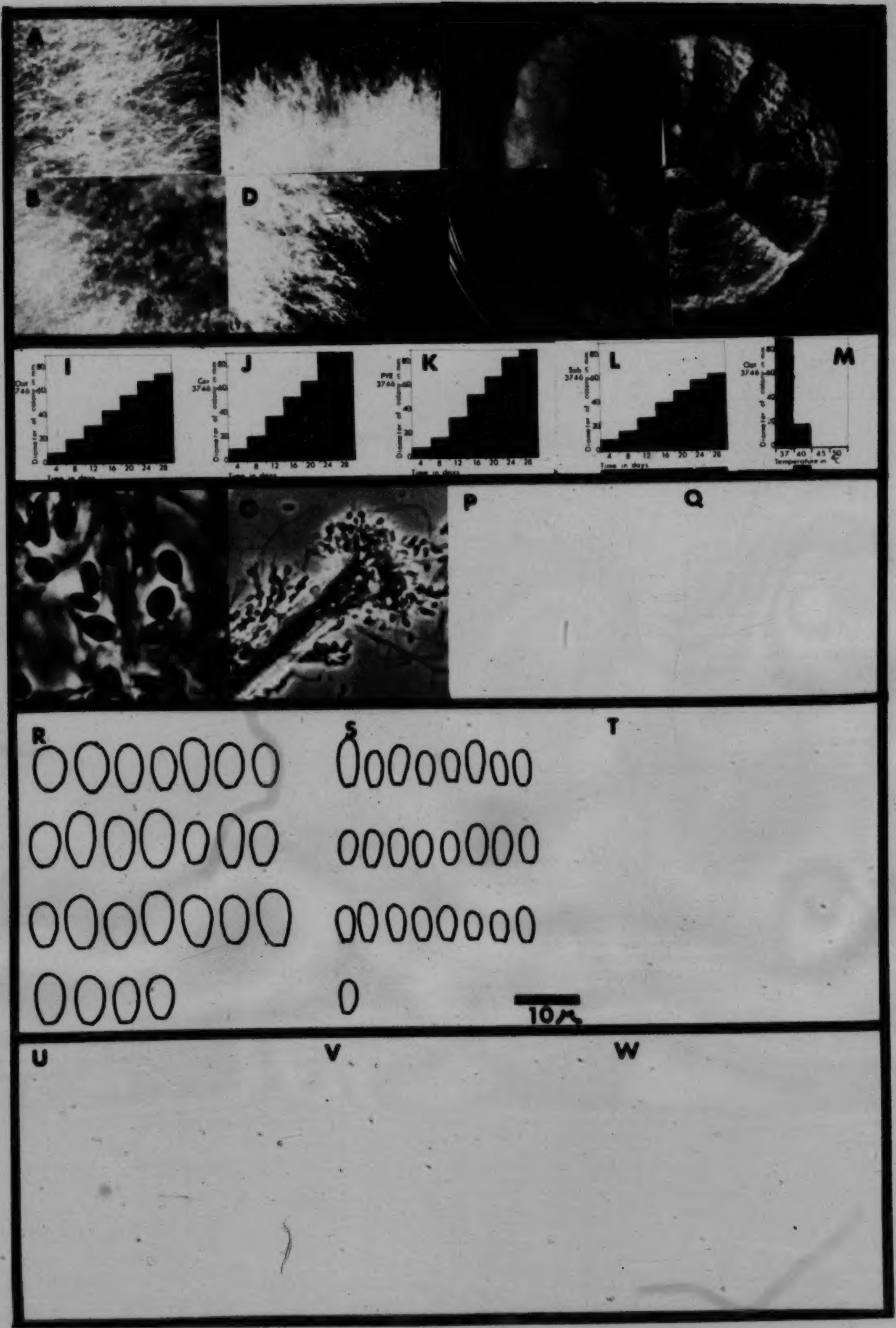

A
B
D
I
J
K
L
M
Oat
3746
Czr
3746
PVE
3746
Sab
3746
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
P
Q
R
S
T
10 μ
U
V
W

Plate #16: *Petriellidium boydii* UAMH 3749

Isolated from cattle manure, Lethbridge, 1974 by R. G. Bell

Received 1974 from Bell as *Petriella setifera* TM

1. **Colonies**
    a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    c. Colour at 28 days (Surface/Reverse)
        1) Oat- Dark grey(mod. to dark mouse brown)/orange
        2) Cer- Dark mouse brown/orange
        3) PYE- Lt. grey/dark burnt orange
        4) Sab- Lt grey-flesh/dark burnt orange
2. **Growth Rates**
    a. at 25°C on different media — Figs. I-L
    b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    a. Diffuse conidia- 5.5-8.5 x 3-5 um — Figs. N,R
    b. Synnematous conidia- 4.5-7.5 x 1.5-2.5 um — Figs. O,S
    c. Ascocarps- not seen — Figs. P,U
    d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

This is a typical *P. boydii* anamorph, although the production of orange pigment is evident.

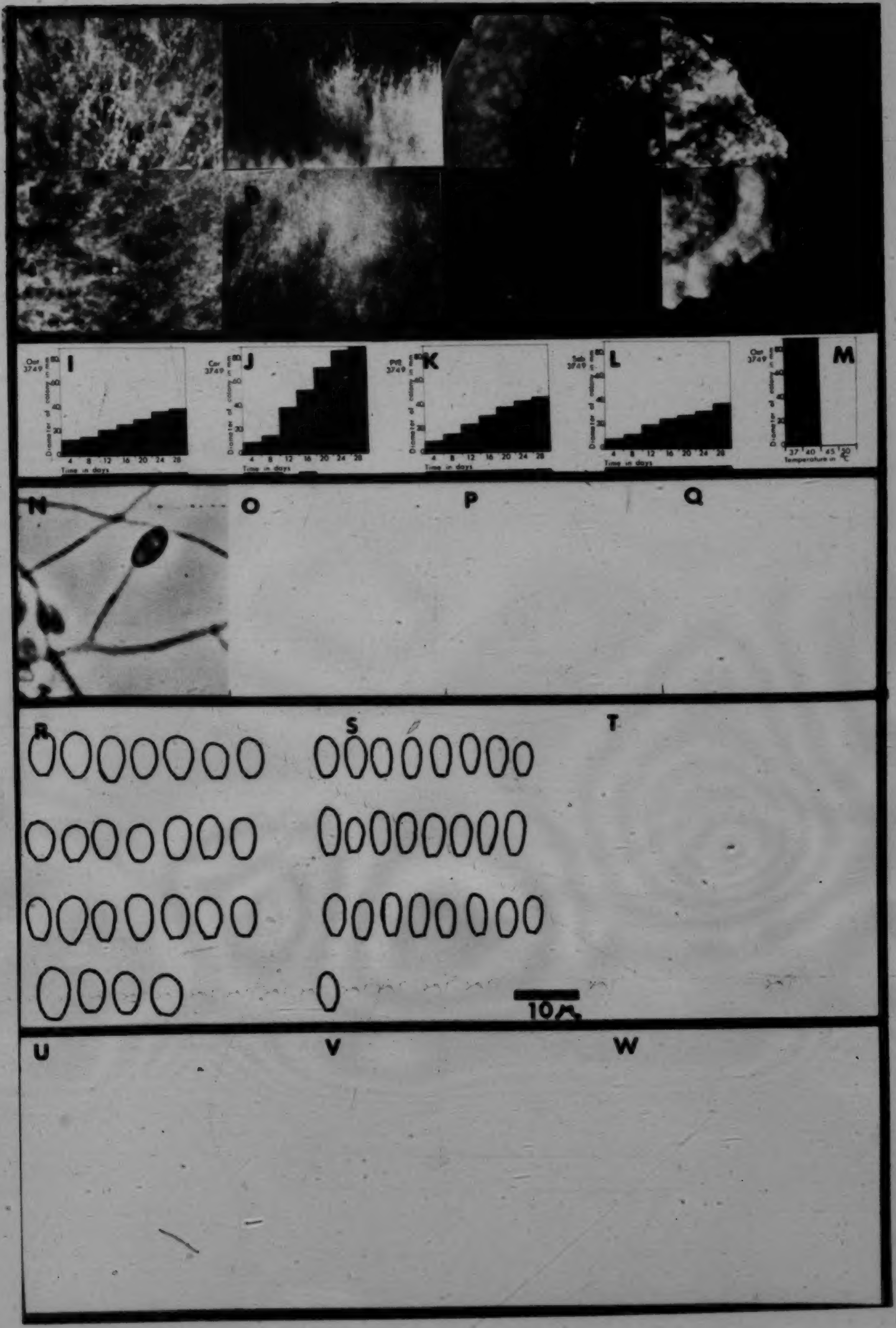

D
I
Oat 3749
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Car 3749
K
PYE 3749
L
Sab 3749
M
Oat 3749
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10µ
U
V
W

Plate #17: *Petriellidium boydii* UAMH 3750

Isolated from cattle manure, Lethbridge, 1974 by R. G. Bell

Received 1974 from Bell as *Petriella setifera* M37

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Mod. mouse brown-grey/mod. dark
        - 2) Cer- Lt. mouse brown(lt. grey)/none
        - 3) PYE- Lt. mouse brown(lt. grey)/yellow-lt. gold
        - 4) Sab- Off white/pale cream green
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6-8.5 x 3.5-5.5 *u*m — Figs. N,R
    - b. Synnematous conidia- 5.5-8 x 2-3.5 *u*m — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* anamorph.

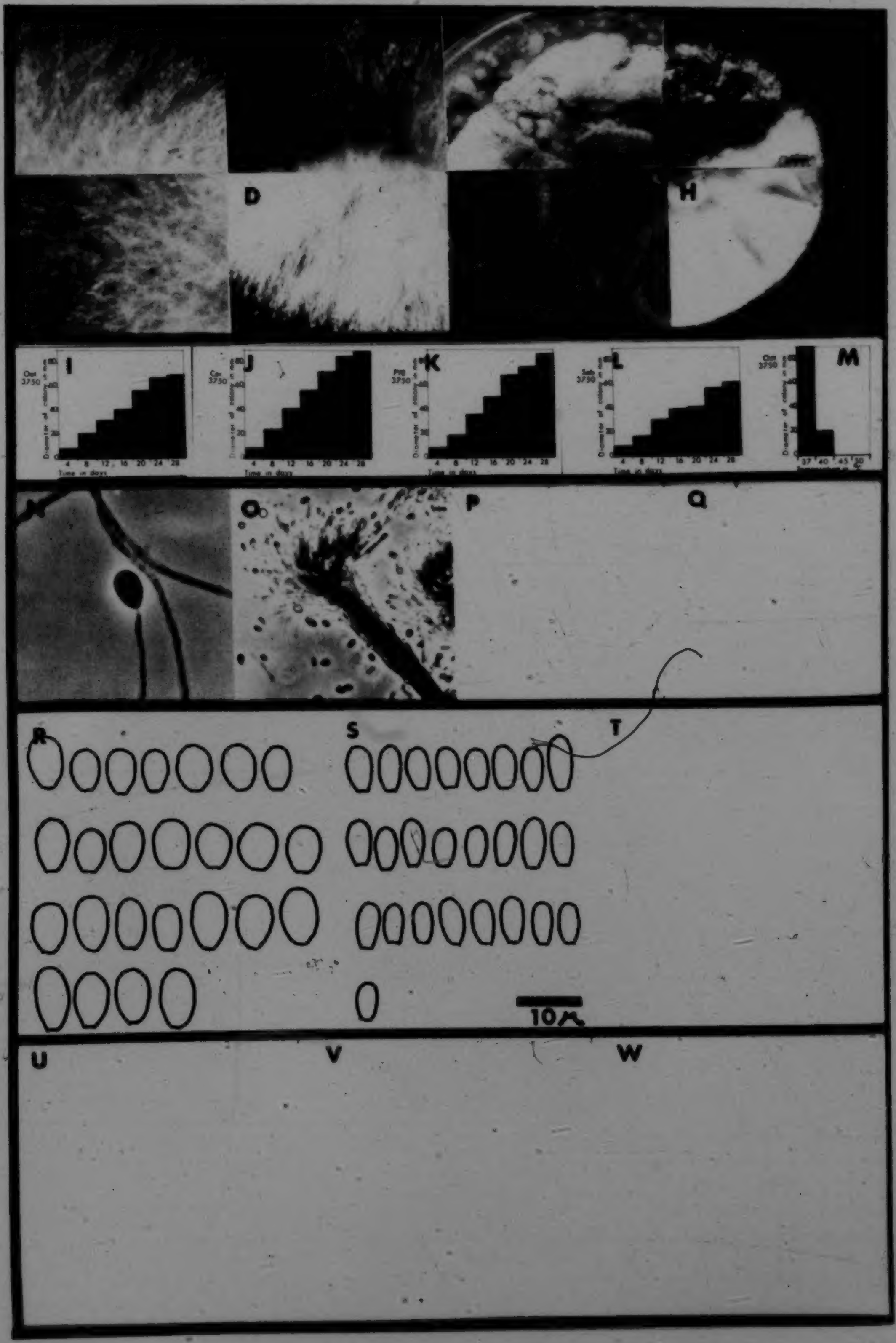

D
H
I
Oat 3750
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cor 3750
K
PYE 3750
L
Sab 3750
M
Oat 3750
37
40
45
50
Temperature in °C
O
P
Q
R
S
T
10µ
U
V
W

Plate #18: *Petriellidium boydii* UAMH 3872

Isolated from cattle manure, Lethbridge, 1975 by R. G. Bell

Received 1975 from Bell as *Petriellidium boydii* 1CF1

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Mod. mouse brown(dark mouse brown)/mod. dark
     - 2) Cer- Lt. mouse brown/none
     - 3) PYE- Lt. mouse brown/yellow
     - 4) Sab- Off white/pale yellow green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6-9 x 3.5-6 um — Figs. N,R
   - b. Synnematous conidia- 4.5-7 x 2-3 um — Figs. O,S
   - c. Ascocarps- 88.5-135 um dia. — Figs. P,U
   - d. Ascospores- 6.5-8 x 3.5-5 um,golden — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* strain.

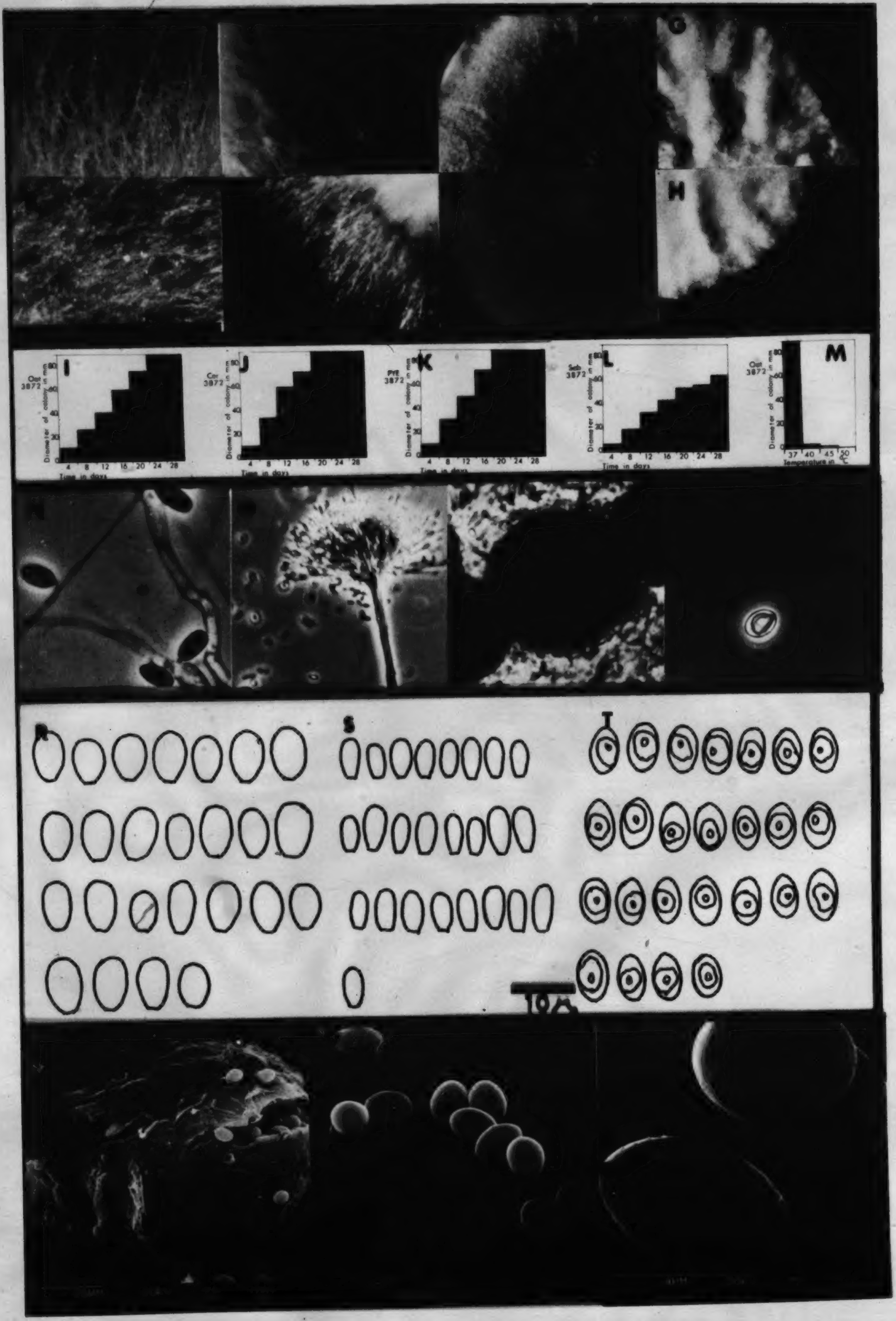

G
H
I
Oat 3872
J
Cor 3872
K
PYE 3872
L
Sab 3872
M
Oat 3872
Diameter of colony in mm
0
20
40
60
80
Time in days
4
8
12
16
20
24
28
Temperature in °C
37
40
45
50
N
R
S
T
10µ

Plate #19: *Petriellidium boydii* UAMH 3873

Isolated from cattle manure, Lethbridge, 1975 by R. G. Bell

Received 1975 from Bell as *Petriellidium boydii* 36F1

1. **Colonies**
    a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    c. Colour at 28 days (Surface/Reverse)
        1) Oat- Dark mouse brown(dark green)/dark
        2) Cer- Dark mouse brown/greenish
        3) PYE- Dark mouse brown/dark orange green
        4) Sab- Mod. mouse brown/olive green
2. **Growth Rates**
    a. at 25°C on different media — Figs. I-L
    b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    a. Diffuse conidia- 6-9.5 x 3.5-5.5 μm — Figs. N,R
    b. Synnematous conidia- 5.5-7 x 1.5-2 μm — Figs. O,S
    c. Ascocarps- 73-133 μm dia. — Figs. P,U
    d. Ascospores- 6-8 x 3.5-5 μm,golden — Figs. Q,T,V,W
4. **Comments**

This is a typical *P. boydii* strain.

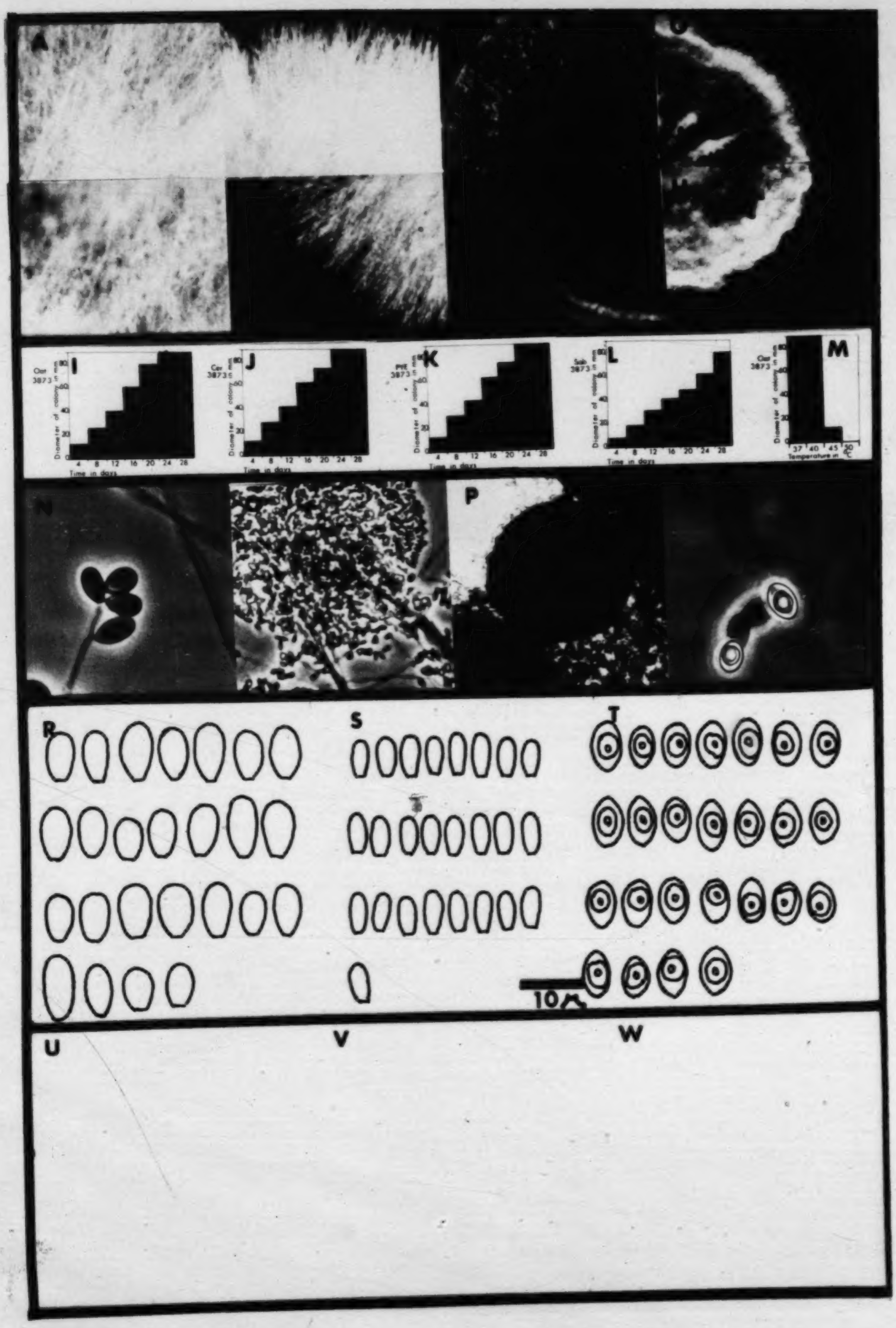

A
G
I
Oat
3873
J
Cer
3873
K
PYE
3873
L
Sab
3873
M
Oat
3873
Diameter of colony mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
P
R
S
T
10µ
U
V
W

Plate #20: *Petriellidium boydii* UAMH 3904

Isolated from Fungus ball- autopsy human, Chicago, 1975 by J. W. Rippon

Received 1975, from Rippon as *Monosporium*?

1. **Colonies**
    a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    c. Colour at 28 days (Surface/Reverse)
        1) Oat- Dark mouse brown(lt. to mod. mouse brown)/dark
        2) Cer- Lt. mouse brown/none
        3) PYE- Mod. mouse brown/yellow green
        4) Sab- Mod. mouse brown(lt. grey)/cream
2. **Growth Rates**
    a. at 25°C on different media — Figs. I-L
    b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    a. Diffuse conidia- 6-8.5 x 3.5-6 *u*m — Figs. N,R
    b. Synnematous conidia- not seen — Figs. O,S
    c. Ascocarps- not seen — Figs. P,U
    d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

This is a typical *P. boydii* anamorph.

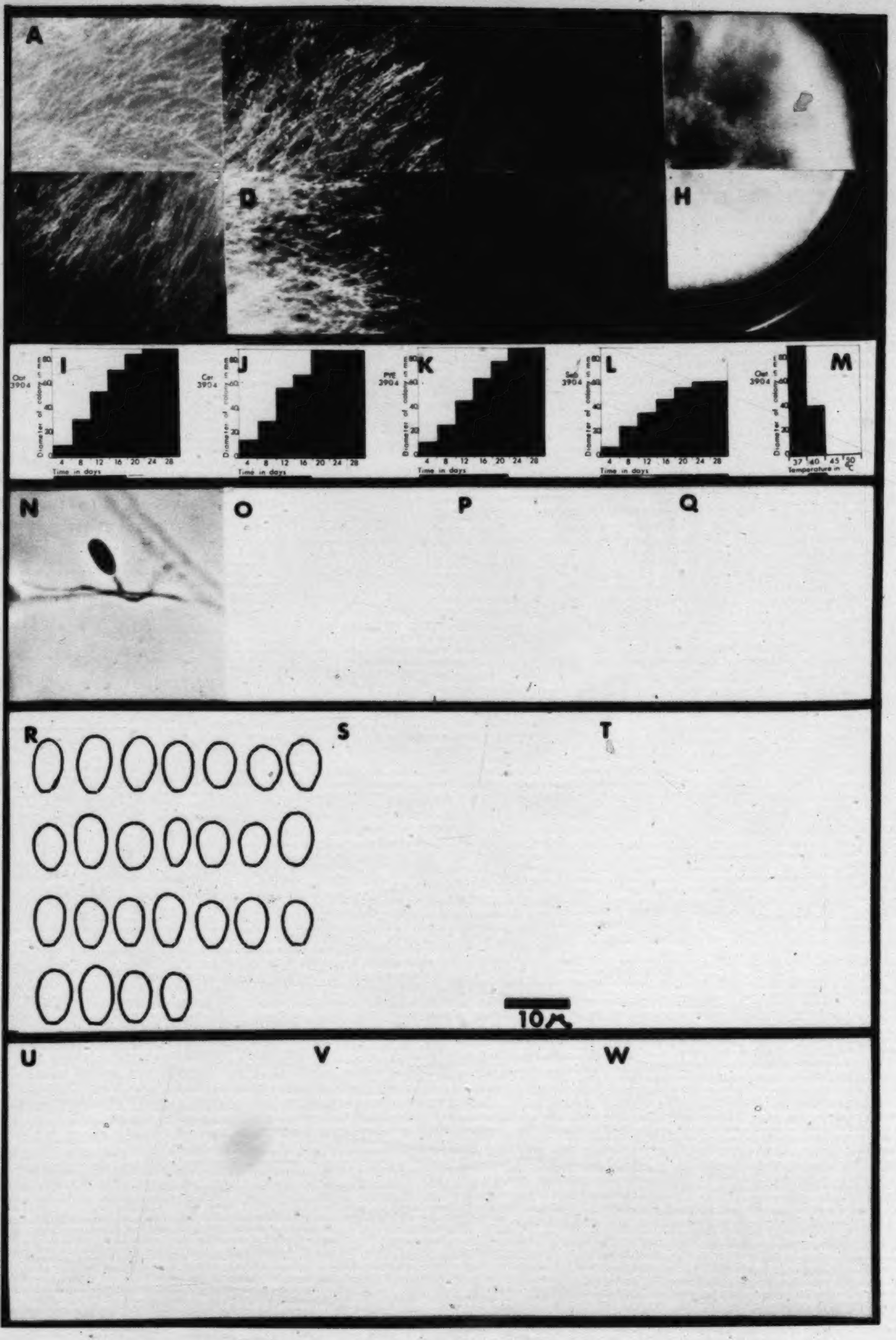

A
D
H
I
J
K
L
M
Oat 3904
Cer 3904
PYE 3904
Sab 3904
Oat 3904
Diameter of colony in mm
Time in days
Temperature in °C
N
O
P
Q
R
S
T
10 μ
U
V
W

Plate #21: *Petriellidium boydii* UAMH 3905

Isolated from sputum, Chicago, 1975 by J. W. Rippon

Received 1975 from Rippon as *Monosporium*

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab   Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab   Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Deep grey-green/dark
        - 2) Cer- Mod. grey(dark grey)/none
        - 3) PYE- Lt. mouse brown/dark olive green
        - 4) Sab- Lt. grey/mod olive green(blue green)
2. **Growth Rates**
    - a. at 25°C on different media   Figs. I-L
    - b. at different temperatures on Oat   Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6.5-10 x 4-6 *u*m   Figs. N,R
    - b. Synnematous conidia- 9.5-22.5 x 2.5-6.5 *u*m   Figs. O,S
    - c. Ascocarps- not seen   Figs. P,U
    - d. Ascospores- not seen   Figs. Q,V,W
4. **Comments**

The *Graphium* conidia are larger than normally seen in the other strains.

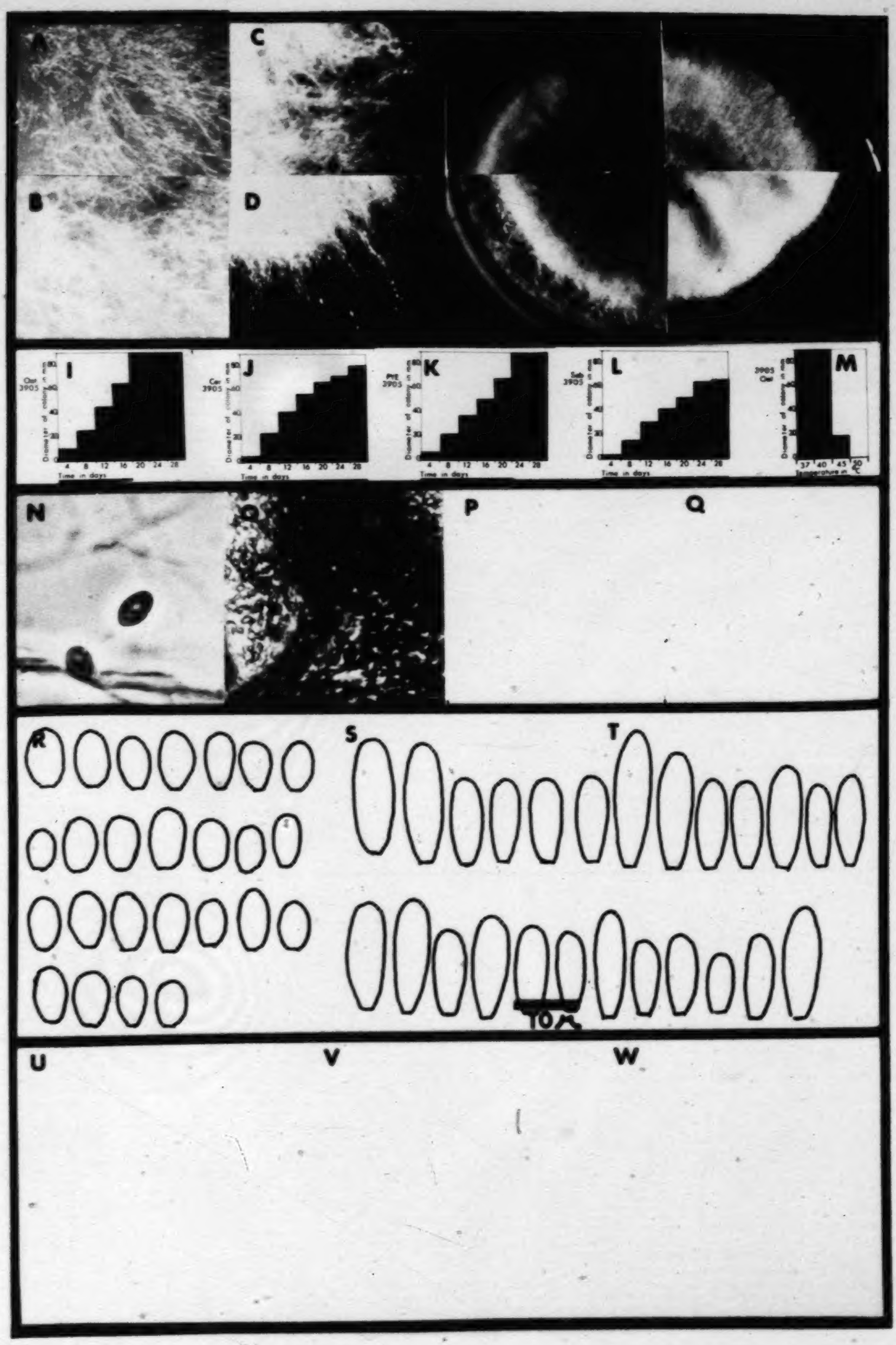

A
B
C
D
I
Oat 3905
J
Cer 3905
K
PYE 3905
L
Sab 3905
M
3905 Oat
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10 μ
U
V
W

Plate #22: *Petriellidium boydii* UAMH 3973

Isolated from knee paramycetoma, Argentina, 1944 by Fischer

Received 1976 from Negroni as *Pseudallescheria shearii* Type strain 5163

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. mouse brown/mod.dark
        - 2) Cer- Lt. mouse brown-grey/none
        - 3) PYE- Lt. mouse brown/yellow green
        - 4) Sab- Lt. grey/cream pale yellow green
2. **Growth Rates**
    - a. at 25°C on different media Figs. I-L
    - b. at different temperatures on Oat Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6-9 x 3.5-5.5 *um* Figs. N,R
    - b. Synnematous conidia- not seen Figs. O,S
    - c. Ascocarps- not seen Figs. P,U
    - d. Ascospores- not seen Figs. Q,T,V,W
4. **Comments**

    This is the type strain of *Pseudallescheria shearii*. It is a typical *P. boydii* anamorph.

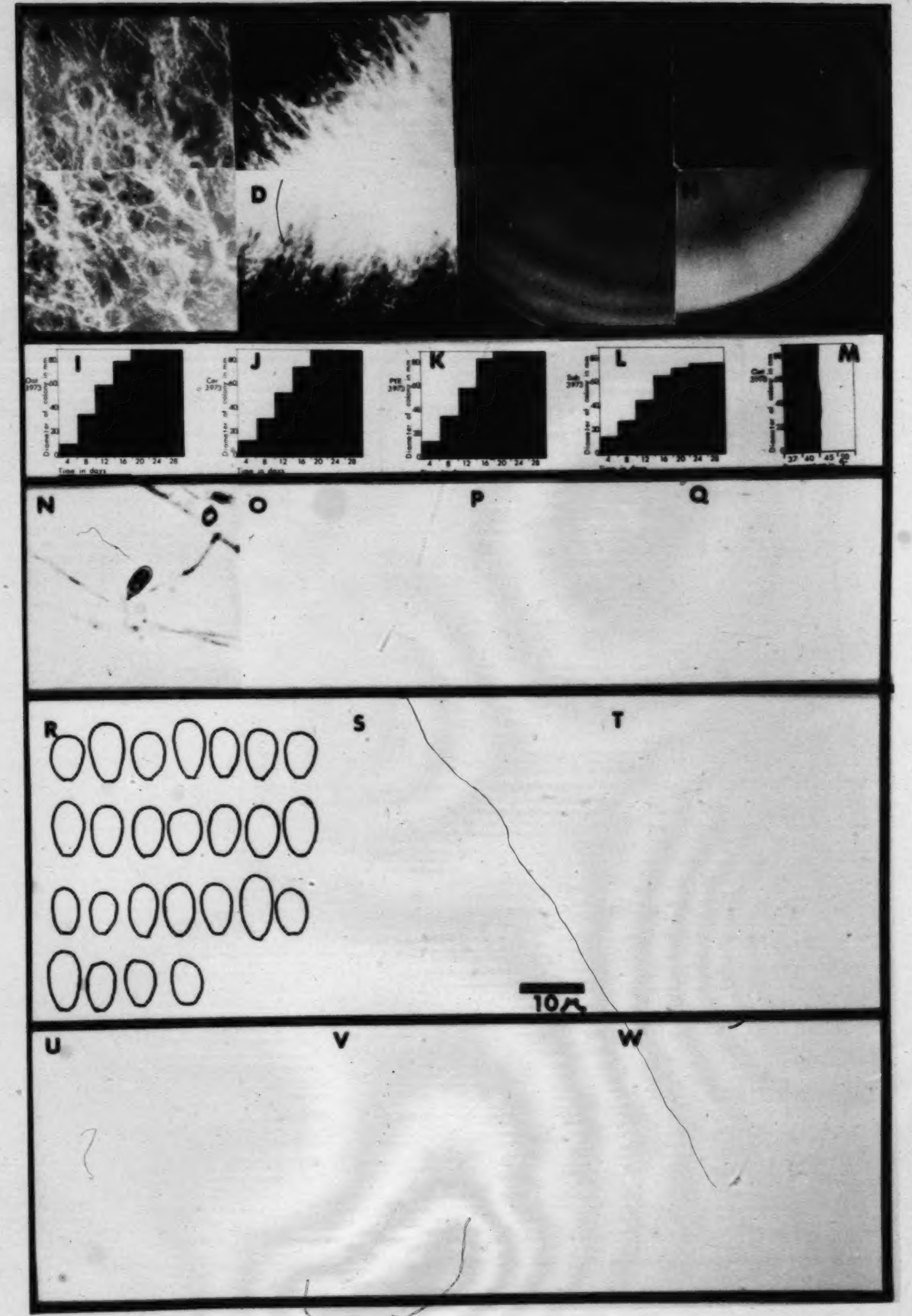

D
H
I
J
K
L
M
Diameter of colony in mm
Time in days
0
20
40
60
80
4
8
12
16
20
24
28
Car 3973
PYE 3973
Sab 3973
37
40
45
50
N
O
P
Q
R
S
T
10µ
U
V
W

Plate #23: *Petriellidium boydii* UAMH 3981

Isolated from man

Received 1976 from CBS as *Petriellidium boydii* CBS 316.54

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     1) Oat- Mod. silver grey/dark
     2) Cer- Mod. grey/none
     3) PYE- Mod. mouse brown-grey/dark olive green
     4) Sab- Mod. mouse brown/deep blue green(dark brown)
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 7-10 x 4-6.5 um — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

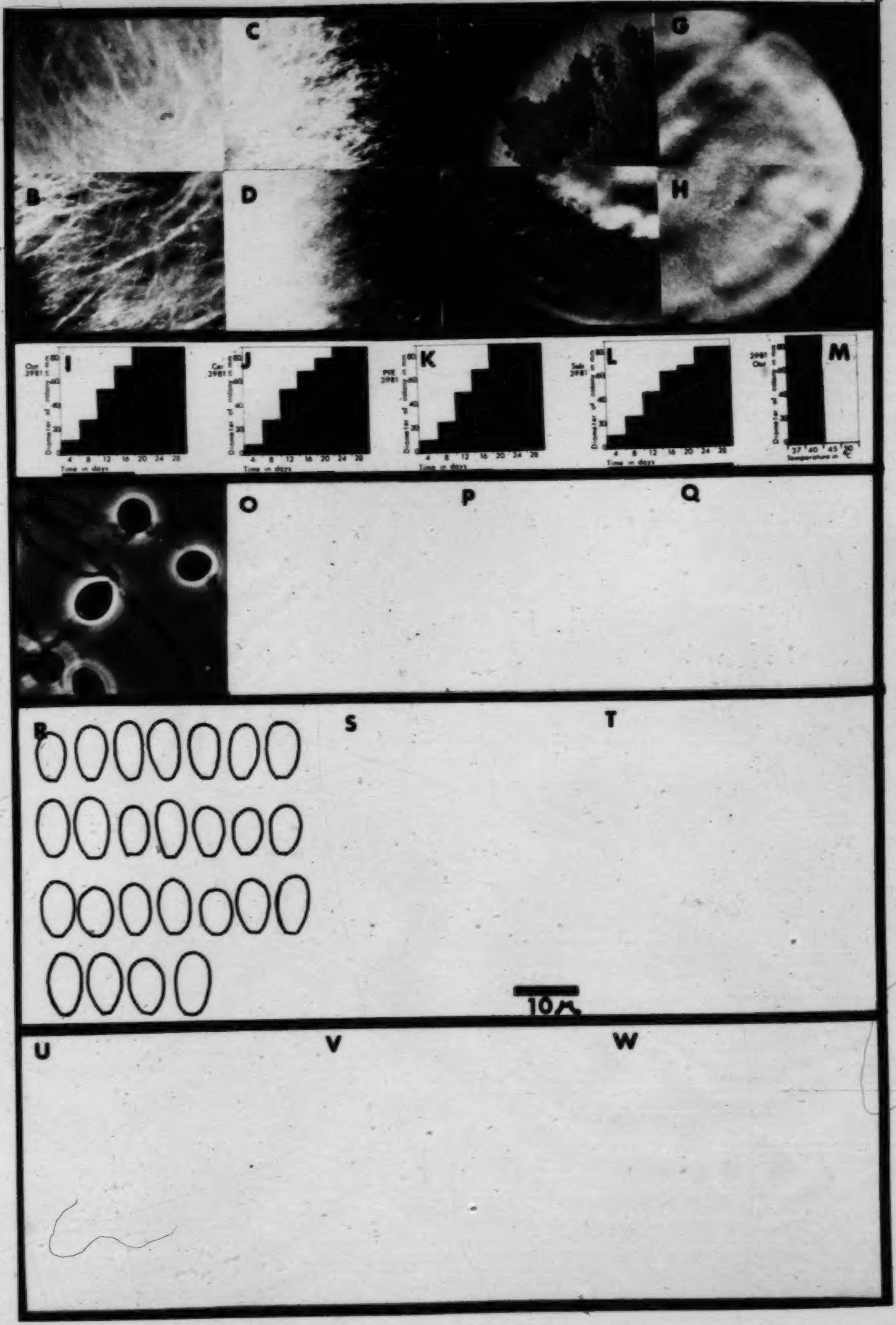

C
G
B
D
H
I
J
K
L
M
Oat 3981
Car 3981
PYE 3981
Sab 3981
3981 Oat
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
O
P
Q
R
S
T
10µ
U
V
W

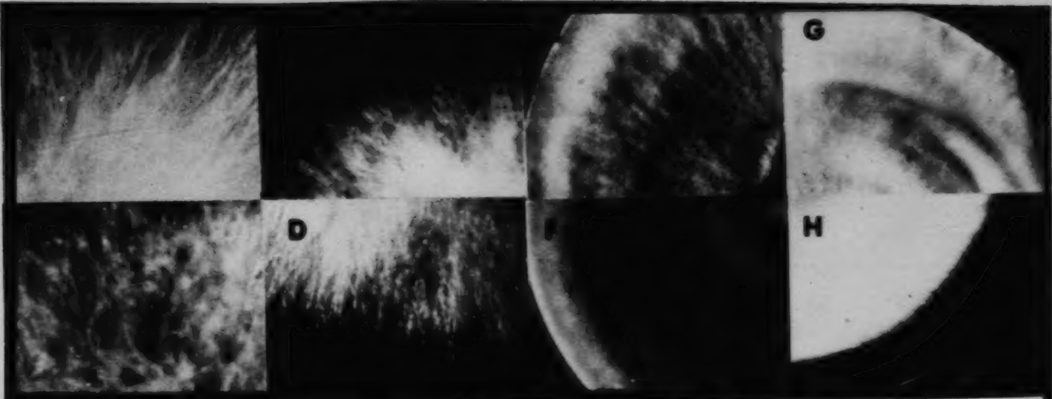
Plate #24: *Petriellidium boydii* UAMH 3982

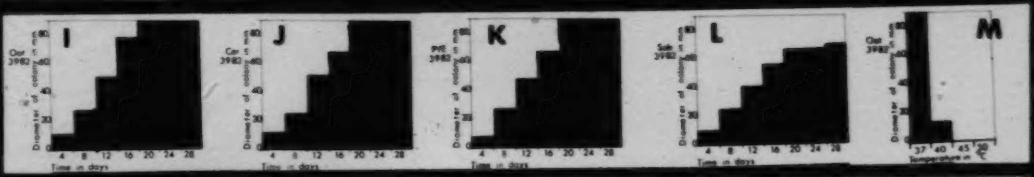
Isolated from mycetoma, Texas, 1921 by C. L. Shear

Received 1976 from CBS as *Petriellidium boydii* Type CBS 101.22

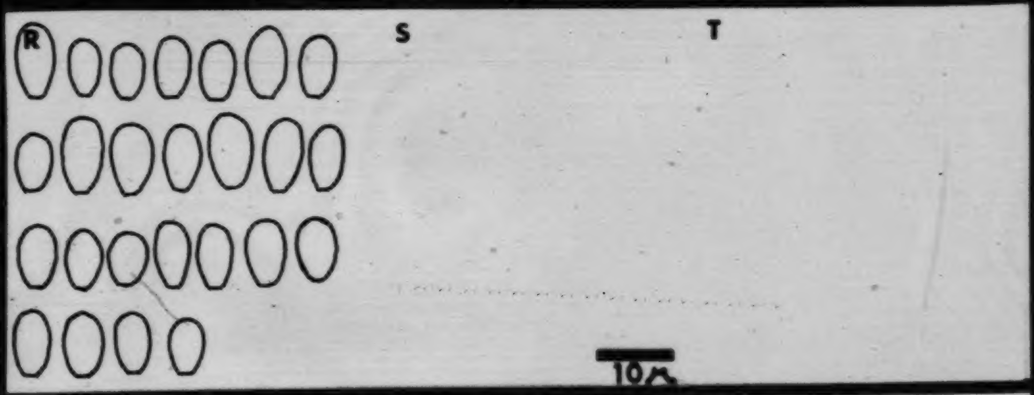
1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Lt. mouse brown(lt. grey)/light(mod. dark)
     - 2) Cer- Mod. mouse brown(mod. grey)/none
     - 3) PYE- Lt. mouse brown-flesh/yellow
     - 4) Sab- Lt. silver/cream(yellow)
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6-10 x 3.5-6 um — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.


G
D
H


I
Oat 3982
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Car 3982
Diameter of colony in mm
Time in days
K
PHE 3982
Diameter of colony in mm
Time in days
L
Sab 3982
Diameter of colony in mm
Time in days
M
Oat 3982
Diameter of colony in mm
37
40
45
50
Temperature in °C

O
P
Q


R
S
T
10µ

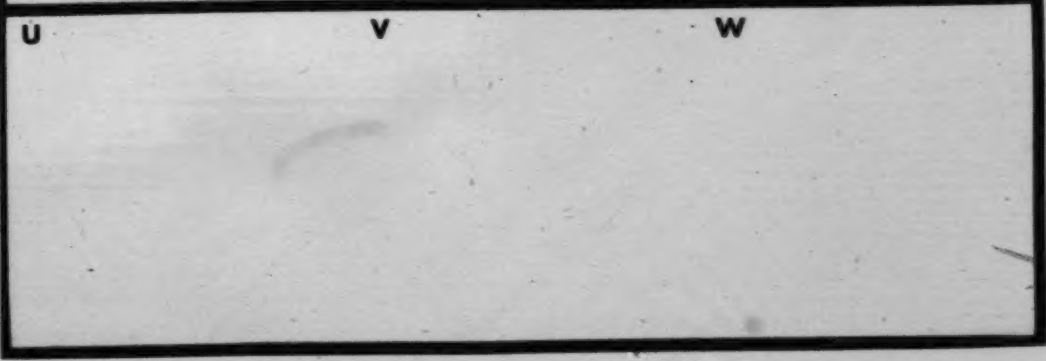

U
V
W

Plate #25: *Petriellidium boydii* UAMH 3987

Isolated from soil, Tadzhikistan, 1973 by O. Fassatiova

Received 1976 from CBS as *Petriellidium ellipsoideum*

Type CBS 418.73

1. **Colonies**
    a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    c. Colour at 28 days (Surface/Reverse)
        1) Oat- Dark olive green/dark
        2) Cer- Lt. mouse brown/none
        3) PYE- Off white/yellow(pie shaped dark area)
        4) Sab- Off white/cream yellow
2. **Growth Rates**
    a. at 25°C on different media — Figs. I-L
    b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    a. Diffuse conidia- 5.5-9 x 3-5.5 *u*m — Figs. N,R
    b. Synnematous conidia- 5.5-9 x 2-3.5 *u*m — Figs. O,S
    c. Ascocarps- 73-128.5 *u*m dia. — Figs. P,U
    d. Ascospores- 6.5-8 x 3.5-5 *u*m,golden — Figs. Q,T,V,W
4. **Comments**

This is the type strain of *P. ellipsoideum*. It is a typical *P. boydii* strain.

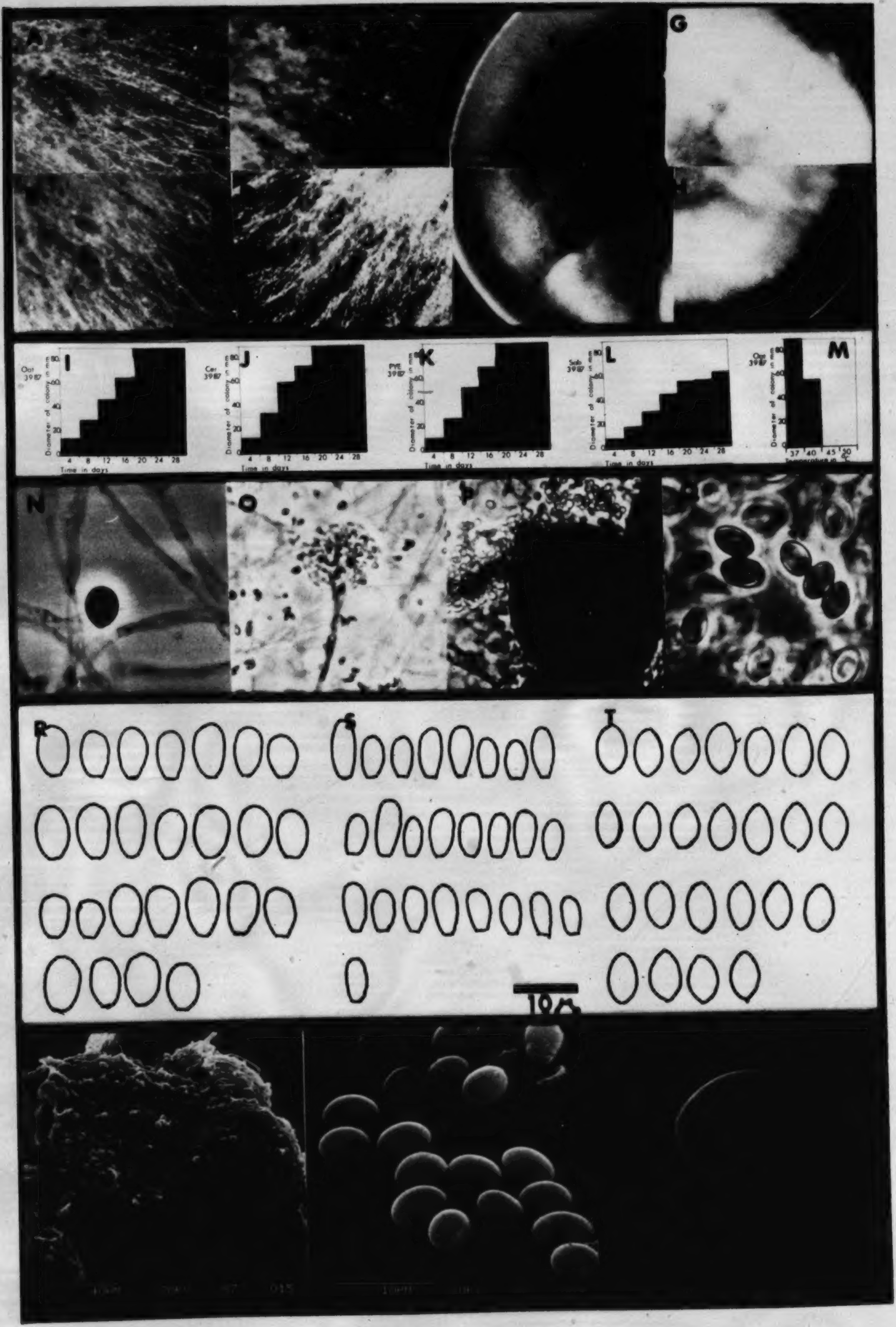

A
G
H
I
J
K
L
M
Oat 3987
Cer 3987
PYE 3987
Sab 3987
Oat 3987
Diameter of colony in mm
0
20
40
60
80
Time in days
4
8
12
16
20
24
28
37
40
45
50
Temperature in °C
N
O
P
R
S
T
10μ

Plate #26: *Petriellidium boydii* UAMH 3990

Isolated from nasal cavity of swine, by A. A. Milko

Received 1976 from CBS as *Petriellidium boydii* CBS 695.70

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Mod. mouse brown(silver grey)/mod. dark
     - 2) Cer- Lt. grey to tan/none
     - 3) PYE- Off white/yellow
     - 4) Sab- Off white/pale yellow green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6-9 x 4-6 um — Figs. N,R
   - b. Synnematous conidia- 6-9 x 2-3.5 um — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

This is the type strain of *Acremonium suis*. It is a typical *P. boydii* anamorph.

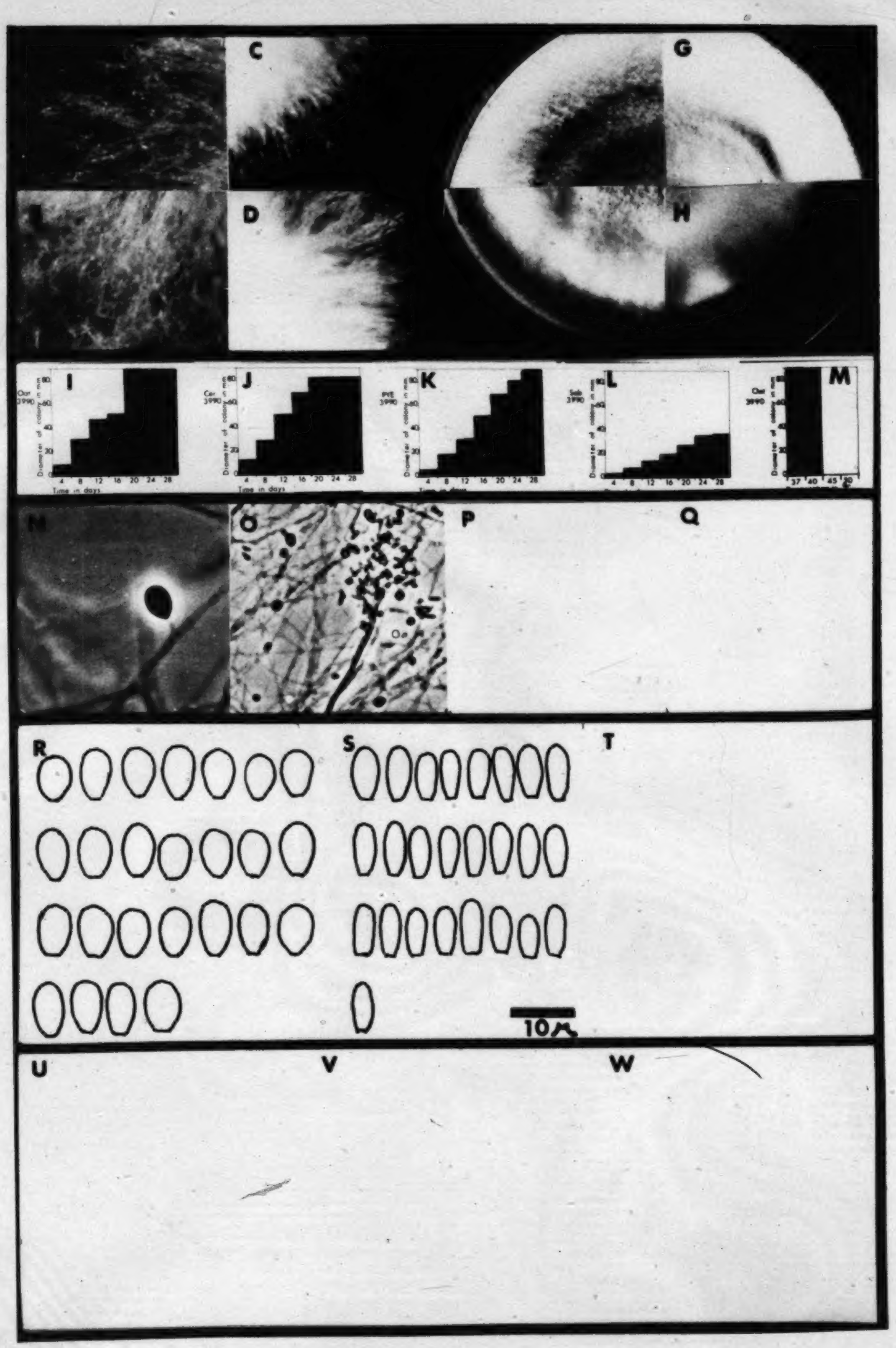

C
G
D
H
I
Oat 3990
Diameter of colony in mm
0
20
40
60
80
4 8 12 16 20 24 28
Time in days
J
Cer 3990
K
PYE 3990
L
Sab 3990
M
Oat 3990
37 40 45 50
N
O
P
Q
R
S
T
10µ
U
V
W

Plate #27: *Petriellidium boydii* UAMH 3991

Isolated from soil by D. Mucke

Received 1976 from CBS as *Petriellidium boydii* CBS 114.59

1. **Colonies**
    a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    c. Colour at 28 days (Surface/Reverse)
        1) Oat- Off white/light(mod. dark)
        2) Cer- Mod. grey/none
        3) PYE- Lt. mouse brown//mod. olive green
        4) Sab- Off white/pale cream green
2. **Growth Rates**
    a. at 25°C on different media — Figs. I-L
    b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    a. Diffuse conidia- 6-8.5 x 3.5-5.5 *u*m — Figs. N,R
    b. Synnematous conidia- not seen — Figs. O,S
    c. Ascocarps- not seen — Figs. P,U
    d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* anamorph.

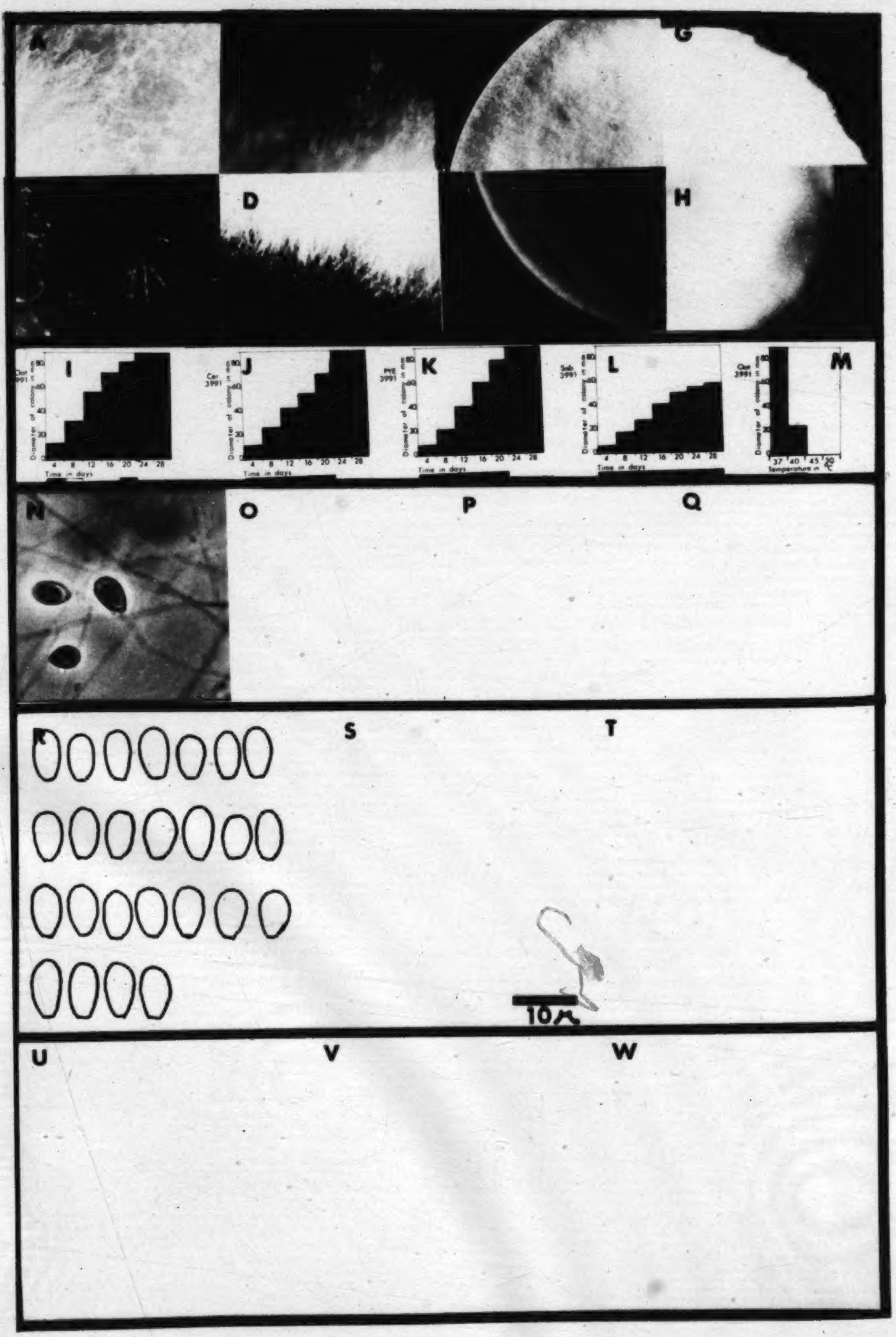

A
G
D
H
I
Oat 3991
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer 3991
Diameter of colony in mm
Time in days
K
PYE 3991
Diameter of colony in mm
Time in days
L
Sab 3991
Diameter of colony in mm
Time in days
M
Oat 3991
Diameter of colony in mm
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10µ
U
V
W

Plate #28: *Petriellidium boydii* UAMH 3995

Isolated from Savannah soil, Africa, by J. L. Renard
Received 1976 from CBS as *Petriellidium boydii* CBS 254.66

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Off white/light
     - 2) Cer- Off white/none
     - 3) PYE- Off white/yellow-gold
     - 4) Sab- Off white/yellow
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 5-8 x 2.5-4.5 um — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

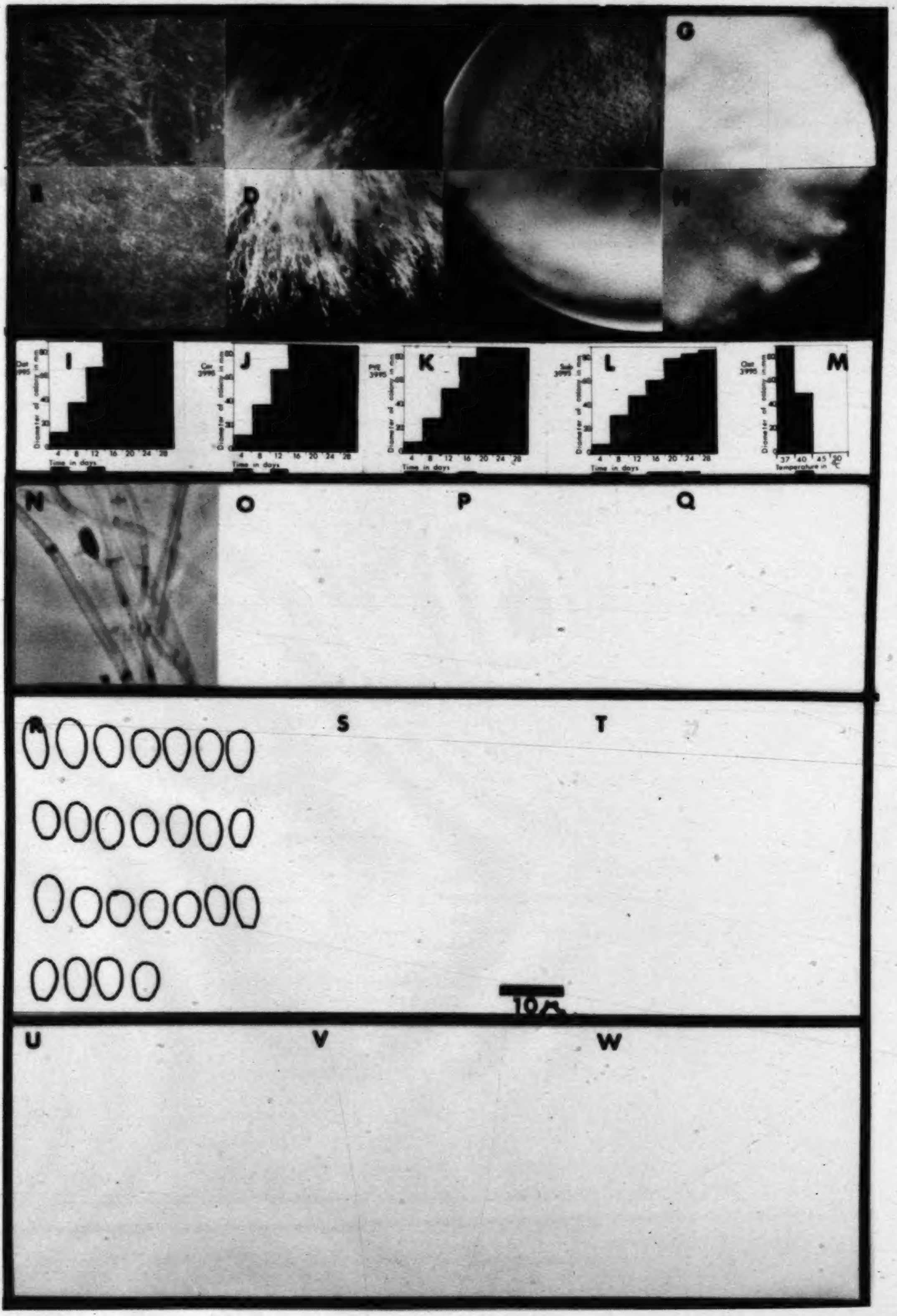

G
B
D
H
I
J
K
L
M
Oat 3995
Cer 3995
PfE 3995
Sab 3995
Oat 3995
Diameter of colony in mm
0
20
40
60
80
4 8 12 16 20 24 28
Time in days
37 40 45 50
Temperature in °C
N
O
P
Q
R
S
T
10μ
U
V
W

Plate #29: *Petriellidium boydii* UAMH 4218

Isolated from eye and chest wall biopsy, Chicago, 1979 by J. Rippon

Received 1979 from Rippon as *Petriellidium boydii*

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Mod. mouse brown(dark olive green)/dark
     - 2) Cer- Mod. mouse brown/none
     - 3) PYE- Mod. mouse brown/yellow green
     - 4) Sab- Lt. mouse brown(mod. grey)/pale olive green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 5-8 x 3.5-5.5 *u*m — Figs. N,R
   - b. Synnematous conidia- 4.5-7 x 2-3.5 *u*m — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

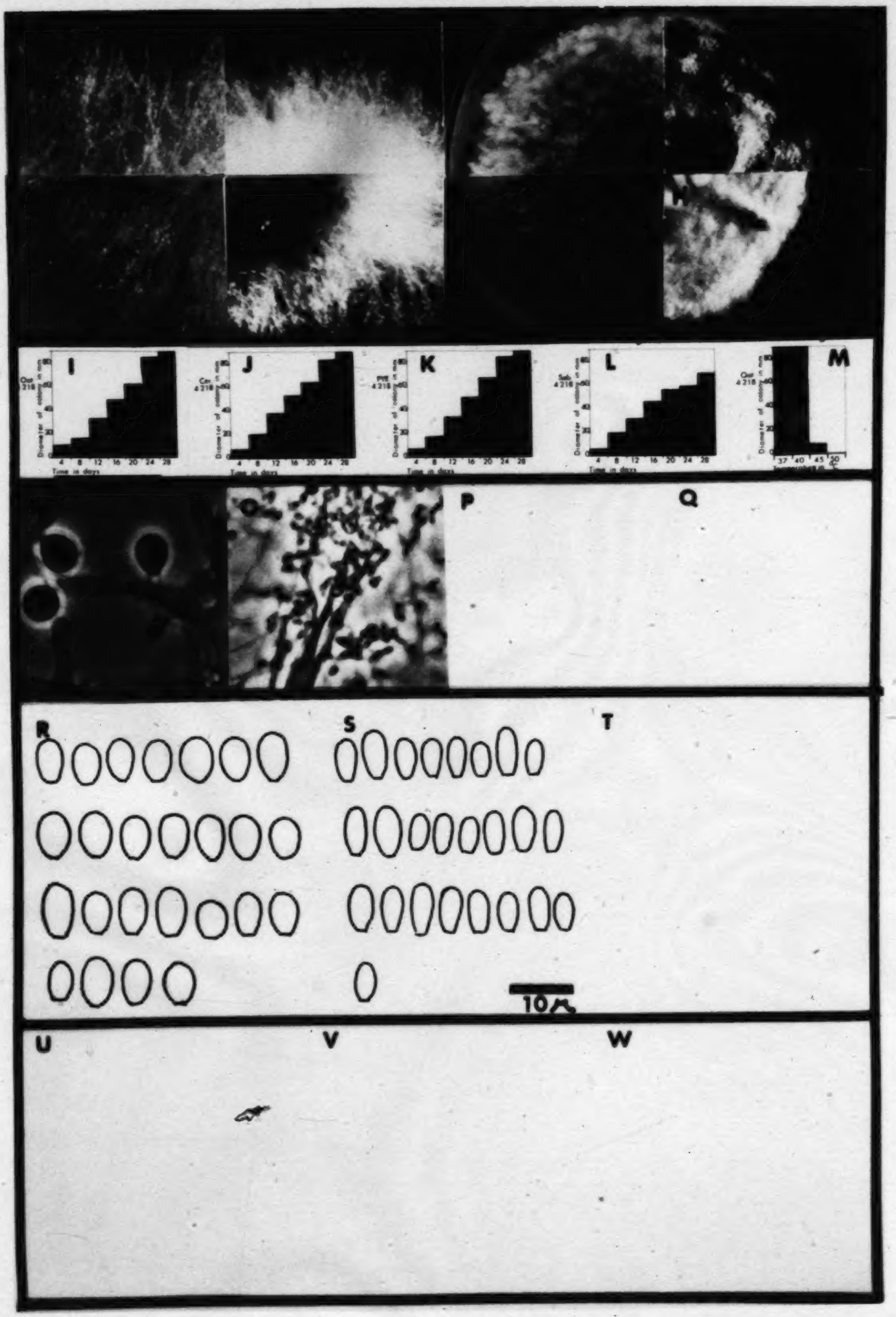

H
I
J
K
L
M
Oat 4218
Cm 4218
PYE 4218
Sab 4218
Oat 4218
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
P
Q
R
S
T
10μ
U
V
W

Plate #30: *Petriellidium boydii* UAMH 4238

Isolated from immunosuppressed patient at autopsy, UCLA, 1979 by D. Howard

Received 1979 from Howard as *Petriellidium boydii* 8375

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Dark olive green/dark
     - 2) Cer- Mod. mouse brown/none
     - 3) PYE- Dark olive green/dark olive green
     - 4) Sab- Mod. olive green/dark olive green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6-9 x 3.5-5.5 um — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

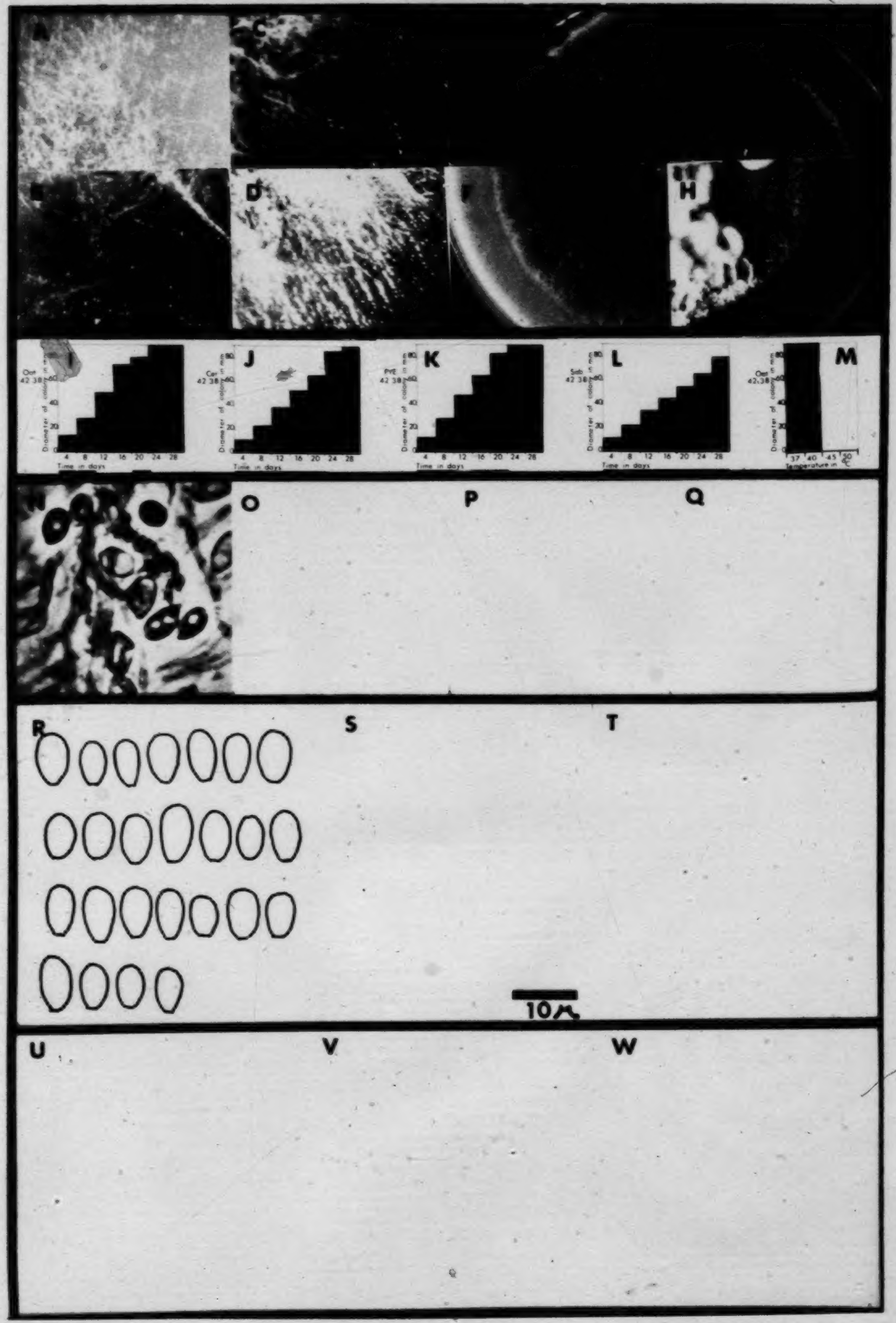

A
C
B
D
F
H
I
Oat
42 38
Diameter of colony in mm
0
20
40
60
4
8
12
16
20
24
28
Time in days
J
Cer
42 38
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
K
PYE
42 38
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
L
Sab
42 38
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
M
Oat
42 38
Diameter of colony in mm
0
20
40
60
80
37
40
45
50
Temperature in °C
O
P
Q
R
S
T
10µ
U
V
W

Plate #31: *Petriellidium boydii* UAMH 4248

Isolated from widespread disseminated disease, UCLA, by D. Howard

Received 1979 from Howard as *Scedosporium* species 3382

1. **Colonies**
   a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   c. Colour at 28 days (Surface/Reverse)
      1) Oat- Dark olive green/dark
      2) Cer- Dark mouse brown/none
      3) PYE- Lt. mouse brown over dark olive green/dark olive green
      4) Sab- Dark olive green/dark olive green
2. **Growth Rates**
   a. at 25°C on different media — Figs. I-L
   b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   a. Diffuse conidia- 6-9 x 3.5-5.5 um — Figs. N,R
   b. Synnematous conidia- not seen — Figs. O,S
   c. Ascocarps- not seen — Figs. P,U
   d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

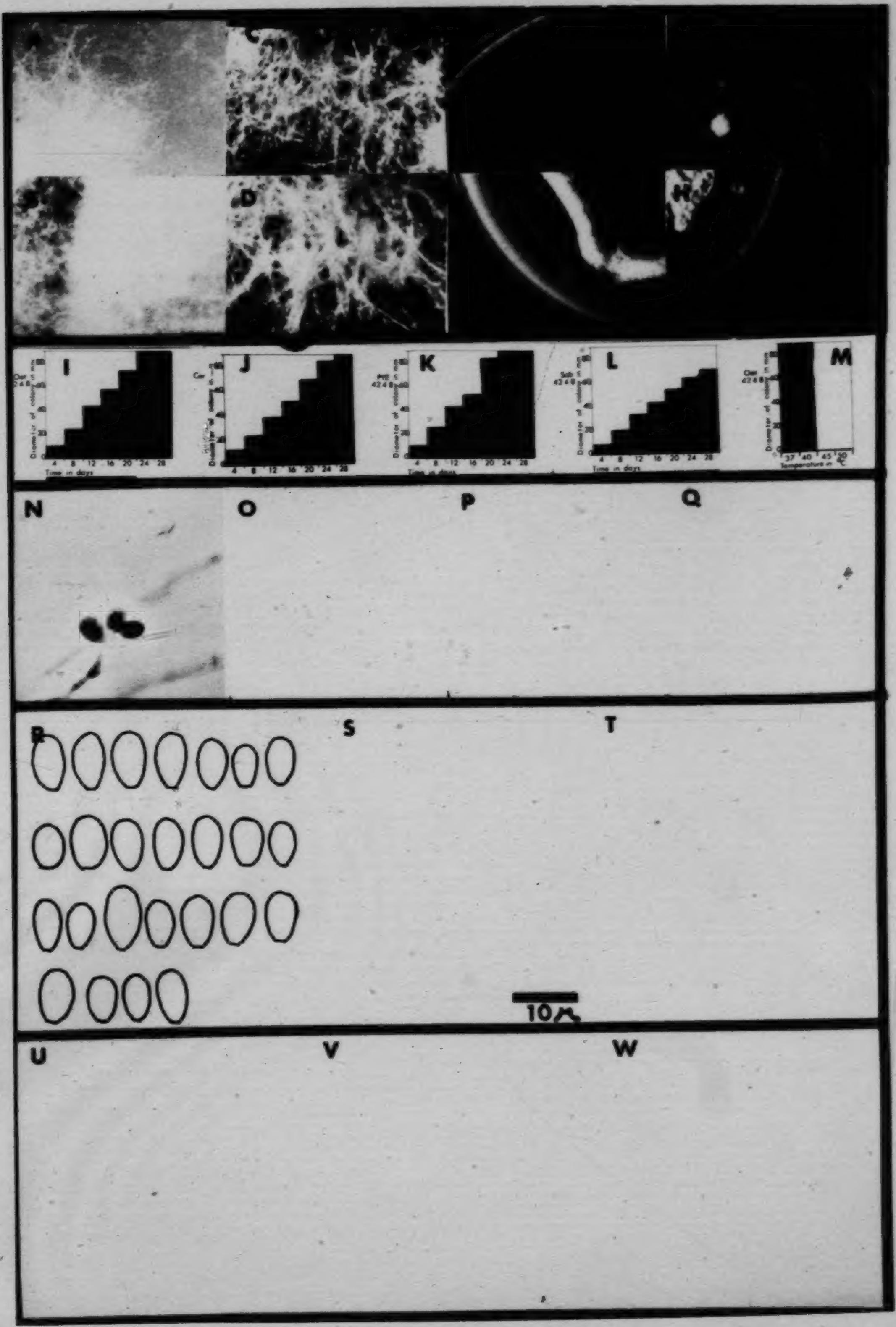

A
C
B
D
H
I
J
K
L
M
Oat
Cer
PYE
Sab
4 2 4 8
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10 μ
U
V
W

Plate #32: *Petriellidium boydii* UAMH 4301

Isolated from sputum, Ontario, 1980 by J. Kane

Received 1980 from Kane as *Petriellidium boydii* OMH 1

1. **Colonies**
   a. 4 days on Oat Cer PYE and Sab Figs. A-D
   b. 21 days on Oat Cer PYE and Sab Figs. E-H
   c. Colour at 28 days (Surface/Reverse)
      1) Oat- Lt. mouse brown/light
      2) Cer- Lt. mouse brown/none
      3) PYE- Off white/gold
      4) Sab- Off white/pale yellow gold
2. **Growth Rates**
   a. at 25°C on different media Figs. I-L
   b. at different temperatures on Oat Fig. M
3. **Microscopic Characters**
   a. Diffuse conidia- 5.5-8.5 x 3-5 *u*m Figs. N,R
   b. Synnematous conidia- not seen Figs. O,S
   c. Ascocarps- not seen Figs. P,U
   d. Ascospores- not seen Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* anamorph.

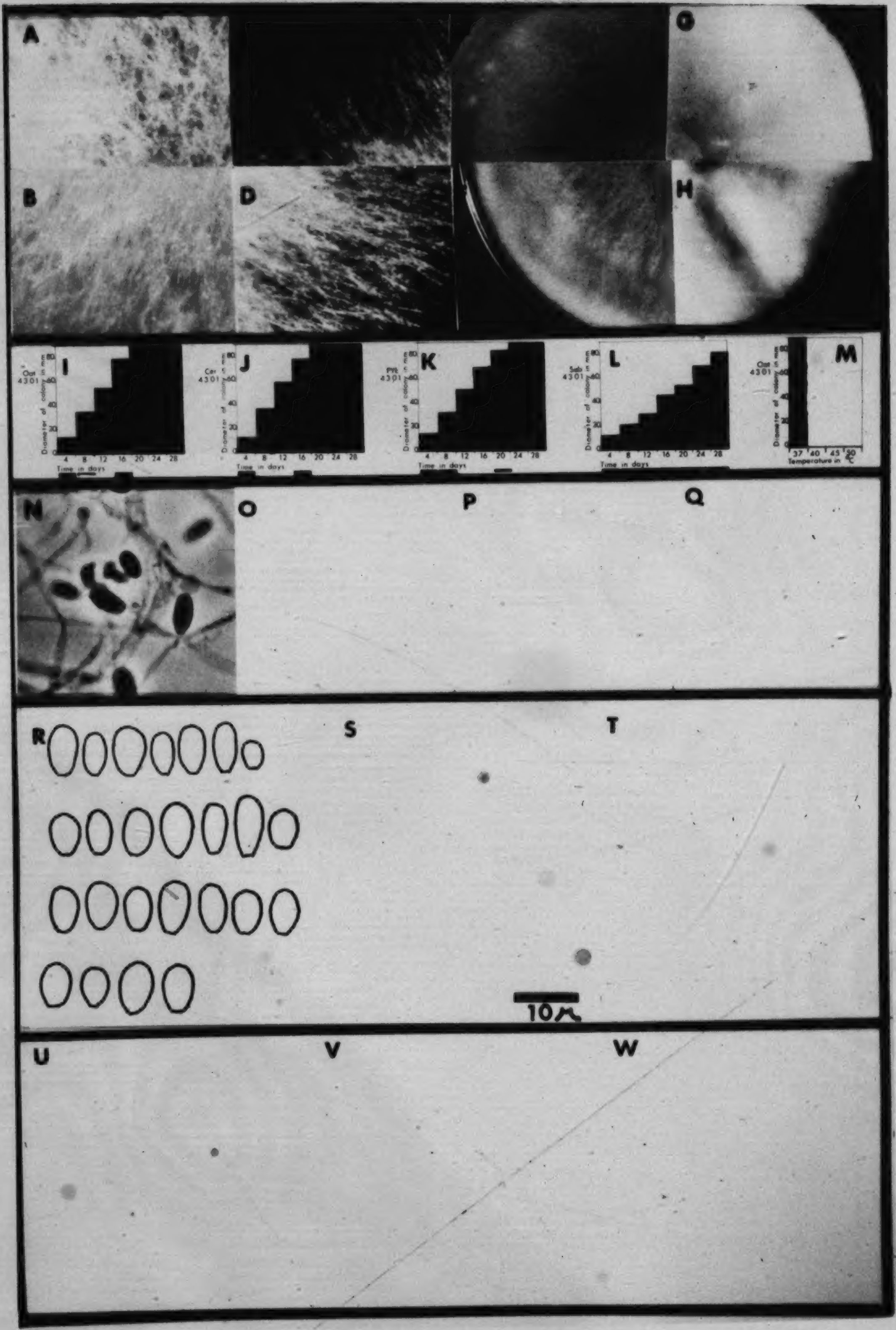

A
B
D
G
H
I
Oat
4301
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer
4301
K
PYE
4301
L
Sab
4301
M
Oat
4301
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10μ
U
V
W

Plate #33: *Petriellidium boydii* UAMH 4302

Isolated from sputum, Ontario, 1980 by J. Kane

Received 1980 from Kane as *Petriellidium boydii* OMH 1159

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Mod. mouse brown/dark
     - 2) Cer- Dark mouse brown/none
     - 3) PYE- Mod. mouse brown/yellow green
     - 4) Sab- Lt. mouse brown/cream
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6-8 x 3-5 *u*m — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- 66.5-107 *u*m dia. — Figs. P,U
   - d. Ascospores- 6-7.5 x 4-5 *u*m,golden — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* strain.

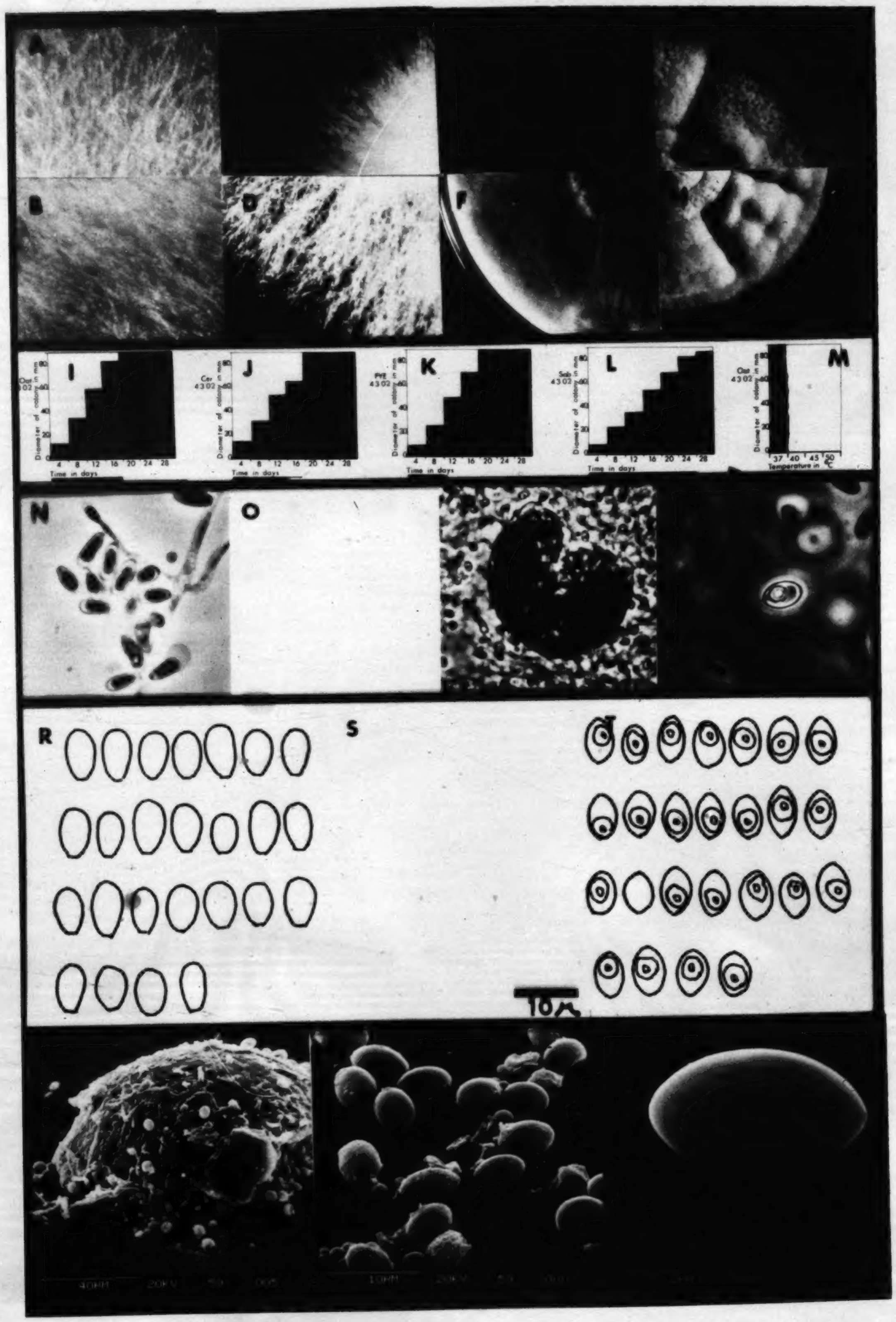

A
B
D
F
I
J
K
L
M
N
O
R
S
T
Oat
4302
Cer
4302
PYE
4302
Sab
4302
Diameter of colony in mm
0
20
40
60
80
Time in days
4
8
12
16
20
24
28
Temperature in °C
37
40
45
50
10µ
40KM
20KV
20KV

Plate #34: *Petriellidium boydii* UAMH 4303

Isolated from sputum, Ontario, 1980 by J. Kane

Received 1980 from Kane as *Petriellidium boydii* Fr 676

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Dark mouse brown/dark
     - 2) Cer- Mod. mouse brown/none
     - 3) PYE- Mod. mouse brown(dark mouse brown)/dark yellow green
     - 4) Sab- Lt. mouse brown/pale yellow green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 6-8.5 x 3.5-5.5 *u*m — Figs. N,R
   - b. Synnematous conidia- 4-8 x 2-3.5 *u*m — Figs. O,S
   - c. Ascocarps- 101.5-155.5 *u*m dia. — Figs. P,U
   - d. Ascospores- 6-8 x 4-5 *u*m,golden — Figs. Q,T,V,W
4. **Comments**

This is a typical *P. boydii* strain. The photographs illustrating colonial growth on Sab. at 4 and 21 days were not available.

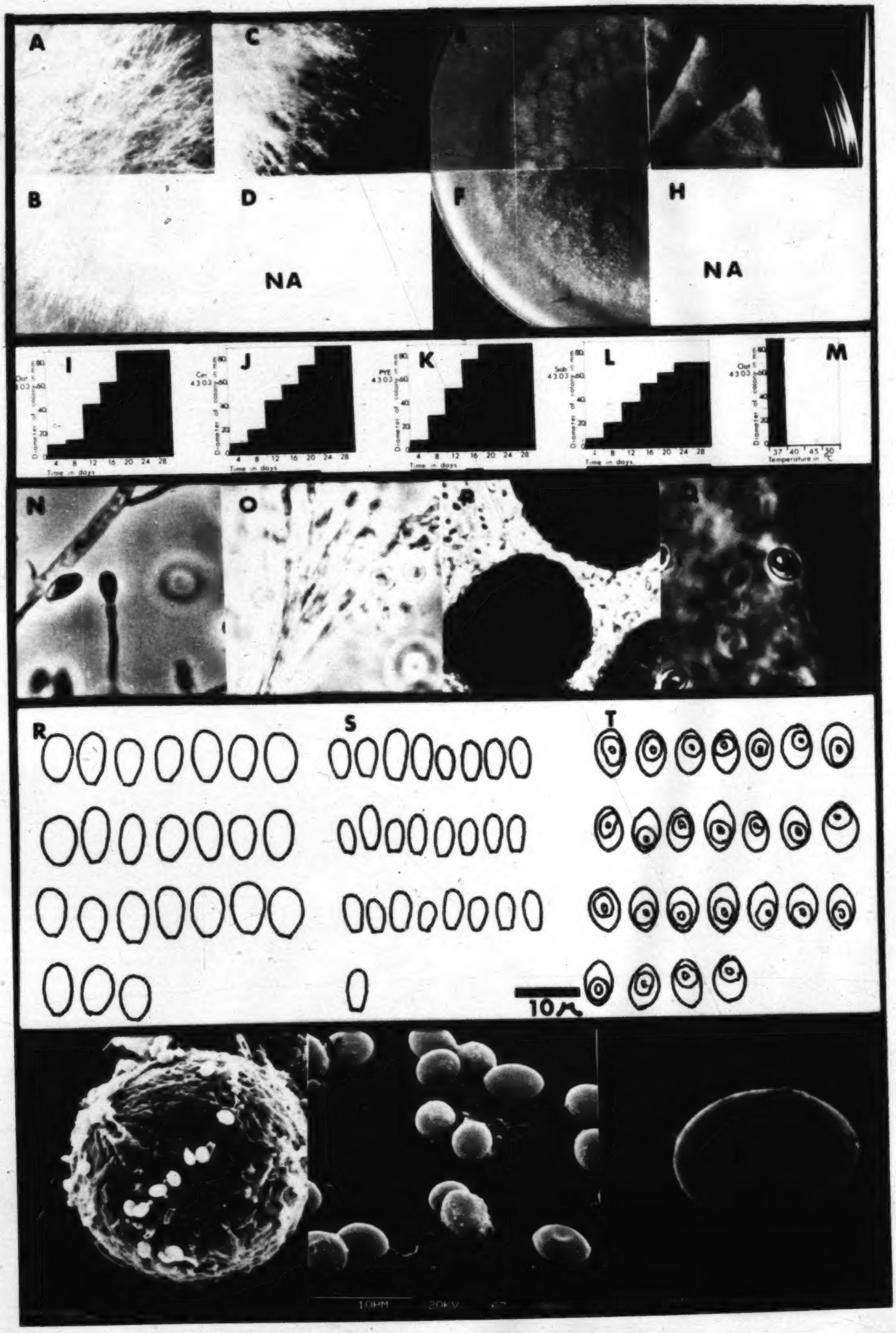

A
C
B
D
NA
F
H
NA
I
Oat
4303
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer
4303
K
PYE
4303
L
Sab
4303
M
Oat
4303
37
40
45
50
Temperature in °C
N
O
R
S
T
10µ
10µm
20KV

Plate #35: *Petriellidium boydii* UAMH 4304

Isolated from sputum, Ontario, 1980 by J. Kane

Received 1980 from Kane as *Petriellidium boydii* Fr 642

1. **Colonies**
   a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   c. Colour at 28 days (Surface/Reverse)
      1) Oat- Mod. mouse brown/dark
      2) Cer- Lt. mouse brown/none
      3) PYE- Mod mouse brown-grey/yellow tan(cream green)
      4) Sab- Lt. grey-green/pale green
2. **Growth Rates**
   a. at 25°C on different media — Figs. I-L
   b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   a. Diffuse conidia- 6-8.5 x 3-5 um — Figs. N,R
   b. Synnematous conidia- 6-11.5 x 2-3.5 um — Figs. O,S
   c. Ascocarps- 92.5-140 um dia. — Figs. P,U
   d. Ascospores- 7-8.5 x 4.5-5.5 um,golden — Figs. Q,T,V,W
4. **Comments**

   This is a typical *P. boydii* strain.

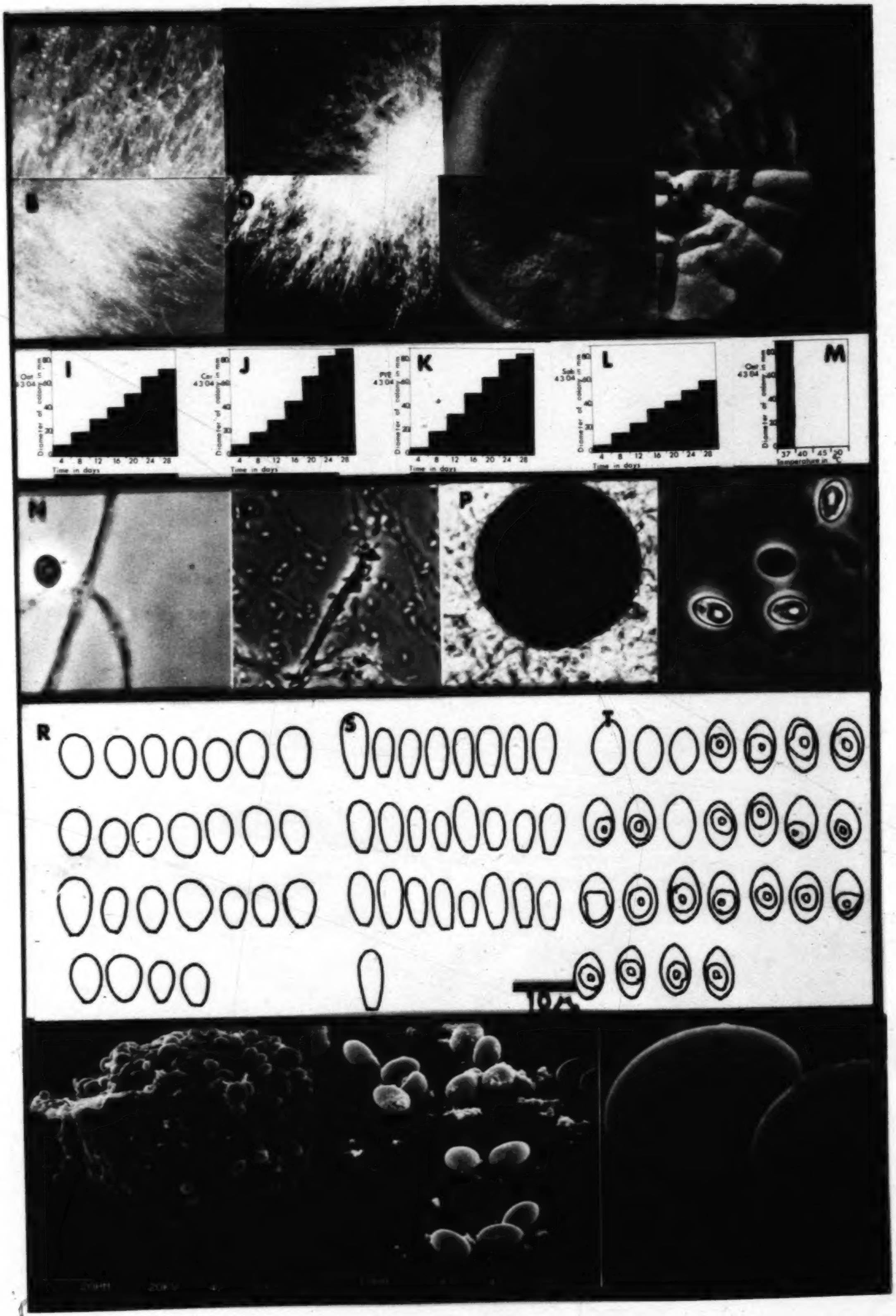

B
D
I
J
K
L
M
Oat
Cor
PYE
Sab
43 04
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
P
R
S
T
10µ

Plate #36: *Petriellidium boydii* UAMH 4310

Isolated from ear sample, Ontario, 1980 by J. Kane

Received 1980 from Kane as *Petriellidium boydii* Fr 806

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Dark mouse brown/dark
        - 2) Cer- Dark mouse brown/none
        - 3) PYE- Dark mouse brown-grey/yellow green
        - 4) Sab- Lt. mouse brown/gold
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5.5-8 x 3-5.5 um — Figs. N,R
    - b. Synnematous conidia- 5.5-9 x 2-3.5 um — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

This is a typical *P. boydii* anamorph. An abundant production of synnemata was observed.

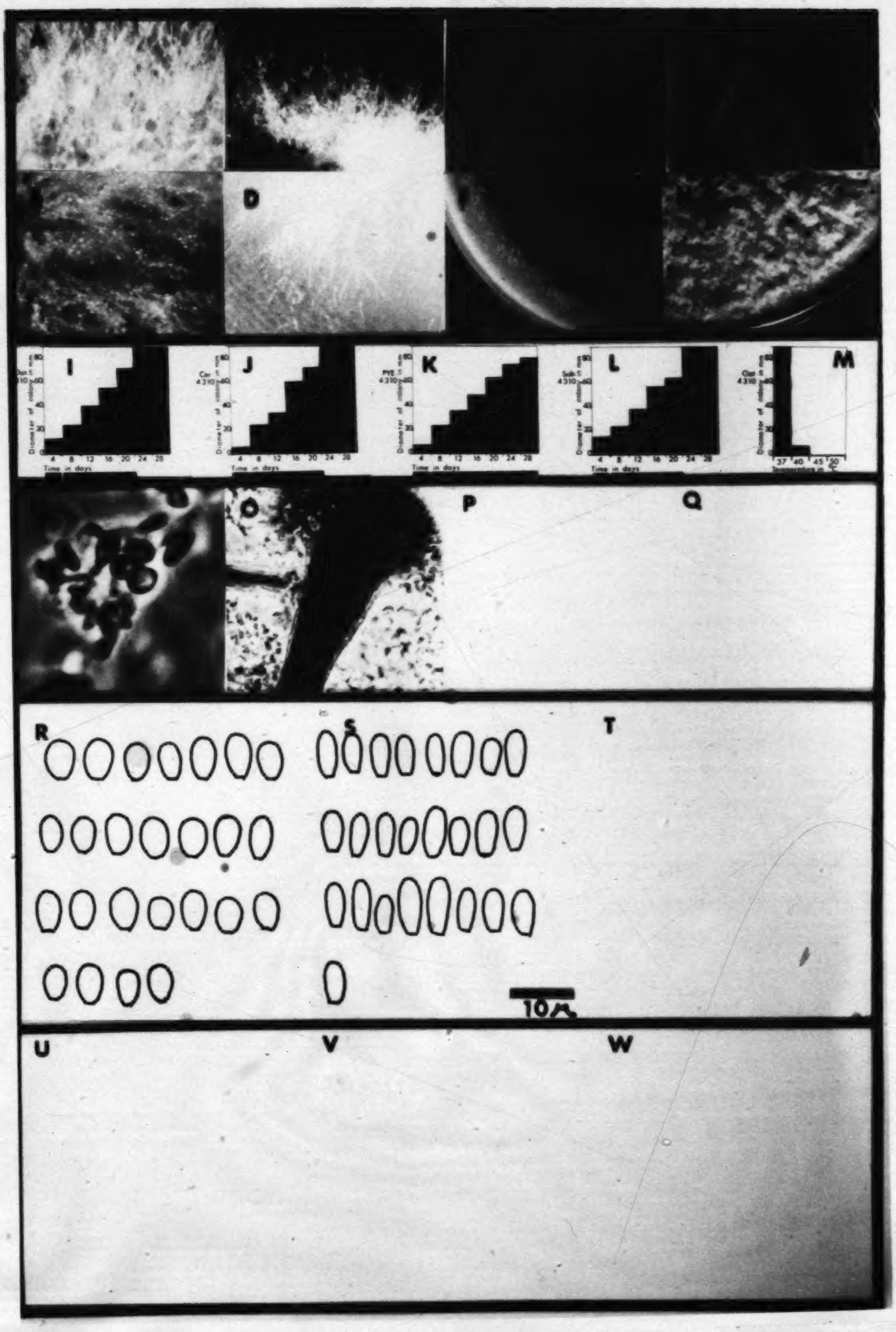

A
D
I
J
K
L
M
Oat 4310
Cer 4310
PYE 4310
Sab 4310
Oat 4310
Diameter of colony in mm
Time in days
4 8 12 16 20 24 28
20 40 60 80
37 40 45 50
Temperature in °C
O
P
Q
R
S
T
10 µ
U
V
W

Plate #37: *Petriellidium boydii* UAMH 4408

Isolated from pasture soil, Alberta, 1980 by V. Mann

Entered 1980 as *Petriellidium boydii* S21F

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. mouse brown-grey/mod.dark
        - 2) Cer- Lt. mouse brown/none
        - 3) PYE- Lt. mouse brown/gold
        - 4) Sab- Lt. mouse brown-grey/pale green
2. **Growth Rates**
    - a. at 25°C on different media Figs. I-L
    - b. at different temperatures on Oat Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5.5-7.5 x 3.5-5 µm Figs. N,R
    - b. Synnematous conidia- 3-7.5 x 1.5-2.5 µm Figs. O,S
    - c. Ascocarps- 133.5-182 µm dia. Figs. P,U
    - d. Ascospores- 7.5-8.5 x 4.5-5 µm,golden Figs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* strain.

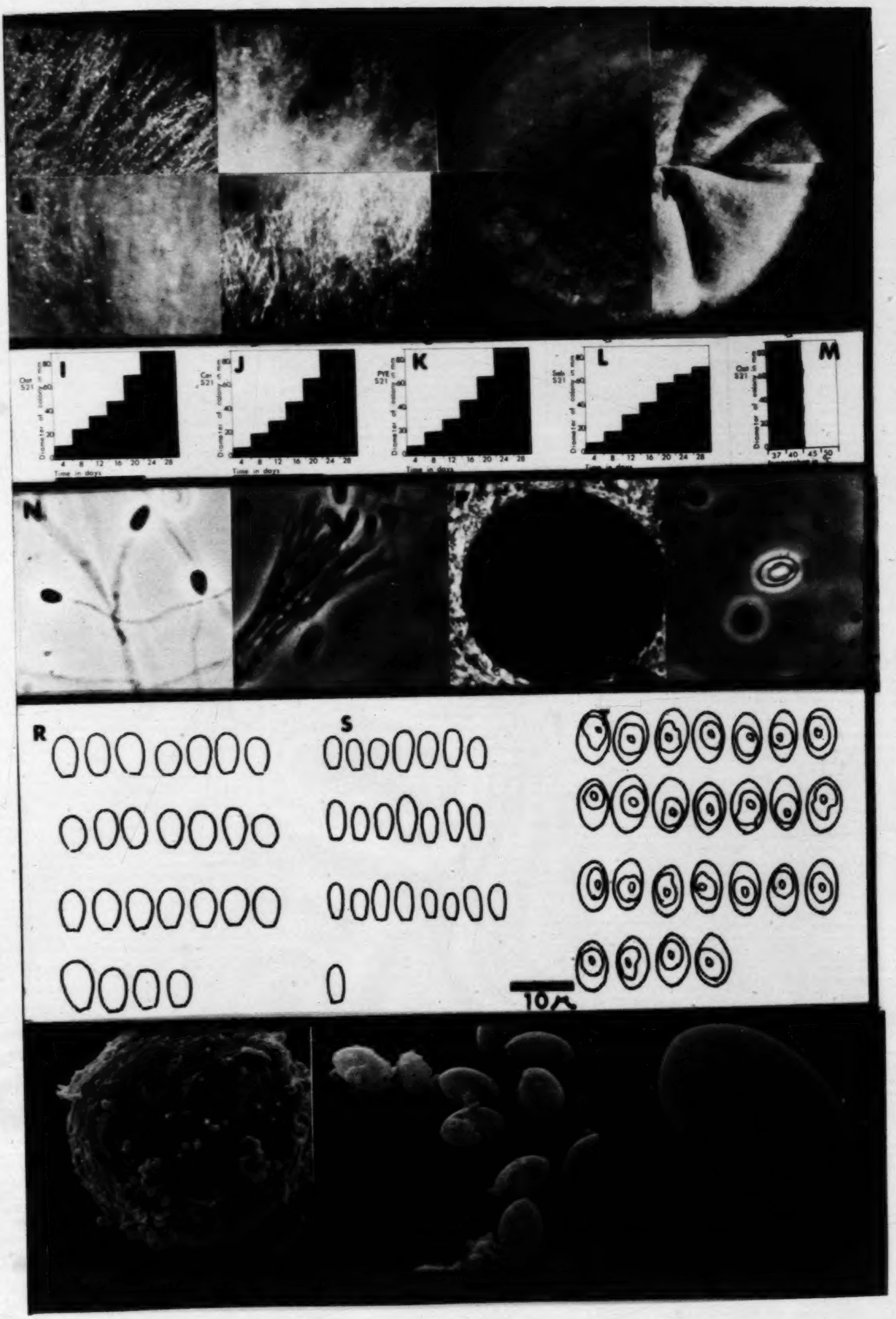

I
Oat
S21
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer
S21
Diameter of colony in mm
Time in days
K
PYE
S21
Diameter of colony in mm
Time in days
L
Sab
S21
Diameter of colony in mm
Time in days
M
Oat
S21
Diameter of colony in mm
37
40
45
50
°C
N
R
S
T
10μ

Plate #38: *Petriellidium boydii* UAMH 4409

Isolated from pasture soil, Alberta, 1980 by V. Mann

Entered 1980 as *Petriellidium boydii* S22DH

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. mouse brown/mod. dark
        - 2) Cer- Lt. mouse brown/none
        - 3) PYE- Lt. mouse brown/yellow gold
        - 4) Sab- Lt. mouse brown/pale lt. green
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5-7.5 x 3-5 µm — Figs. N,R
    - b. Synnematous conidia- 4-7.5 x 1.5-3.5 µm — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* anamorph.

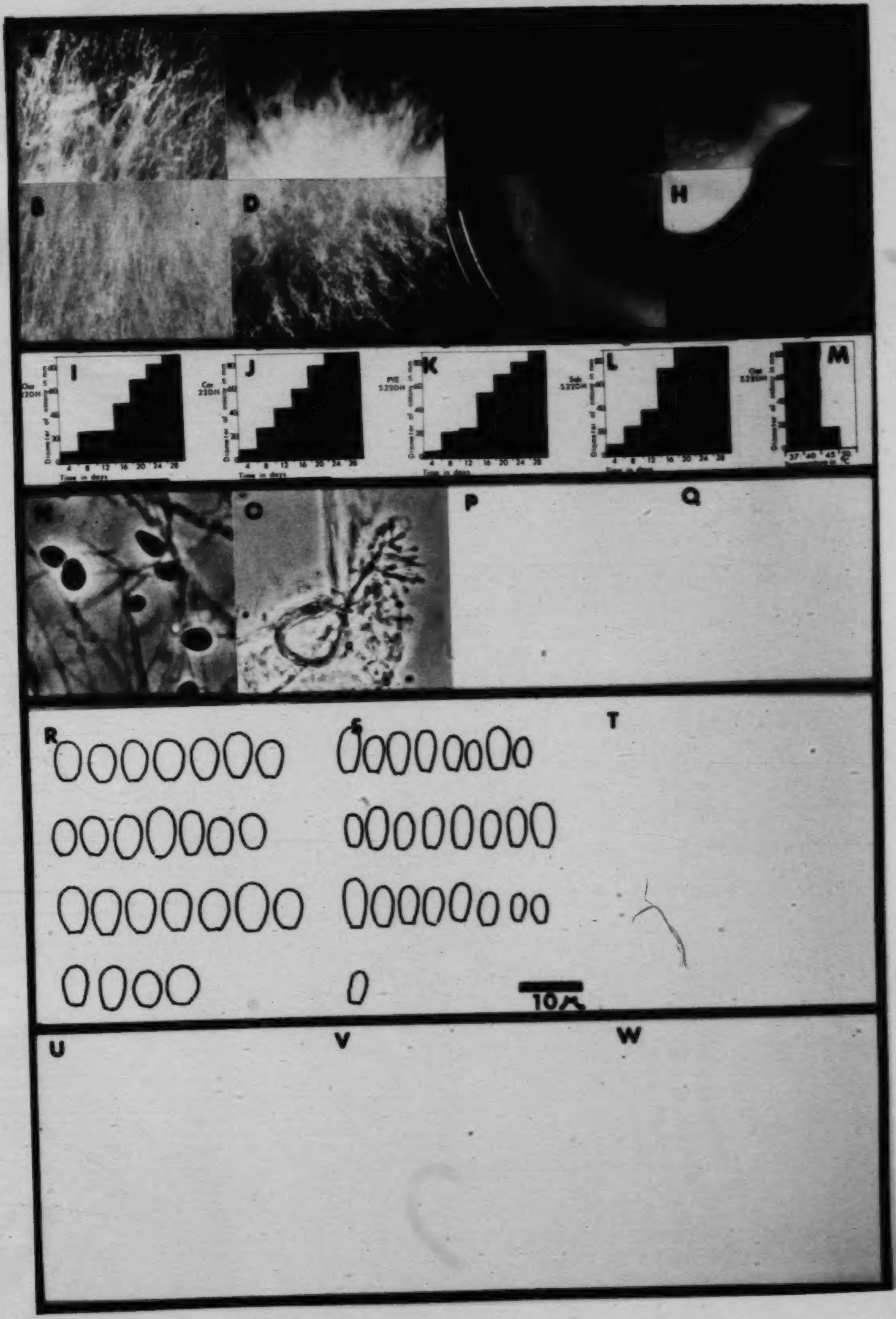

B
D
H
I
J
K
L
M
Diameter of colony in mm
Time in days
4
8
12
16
20
24
28
20
40
60
80
Car
22DH
PIE
S22DH
Sab
S22DH
37
40
45
50
O
P
Q
R
S
T
10µ
U
V
W

Plate #39: *Petriellidium boydii* UAMH 4410

Isolated from pasture soil, Alberta, 1980 by V. Mann

Entered 1980 as *Petriellidium boydii* S22 LH

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. gray/mod.
        - 2) Cer- Lt. mouse brown/none
        - 3) PYE- Mod. mouse brown/gold
        - 4) Sab- White/cream
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5.5-8 x 3.5-5.5 *um* — Figs. N,R
    - b. Synnematous conidia- 5-6.5 x 1.5-3.5 *um* — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

    This is a typical *P. boydii* anamorph.

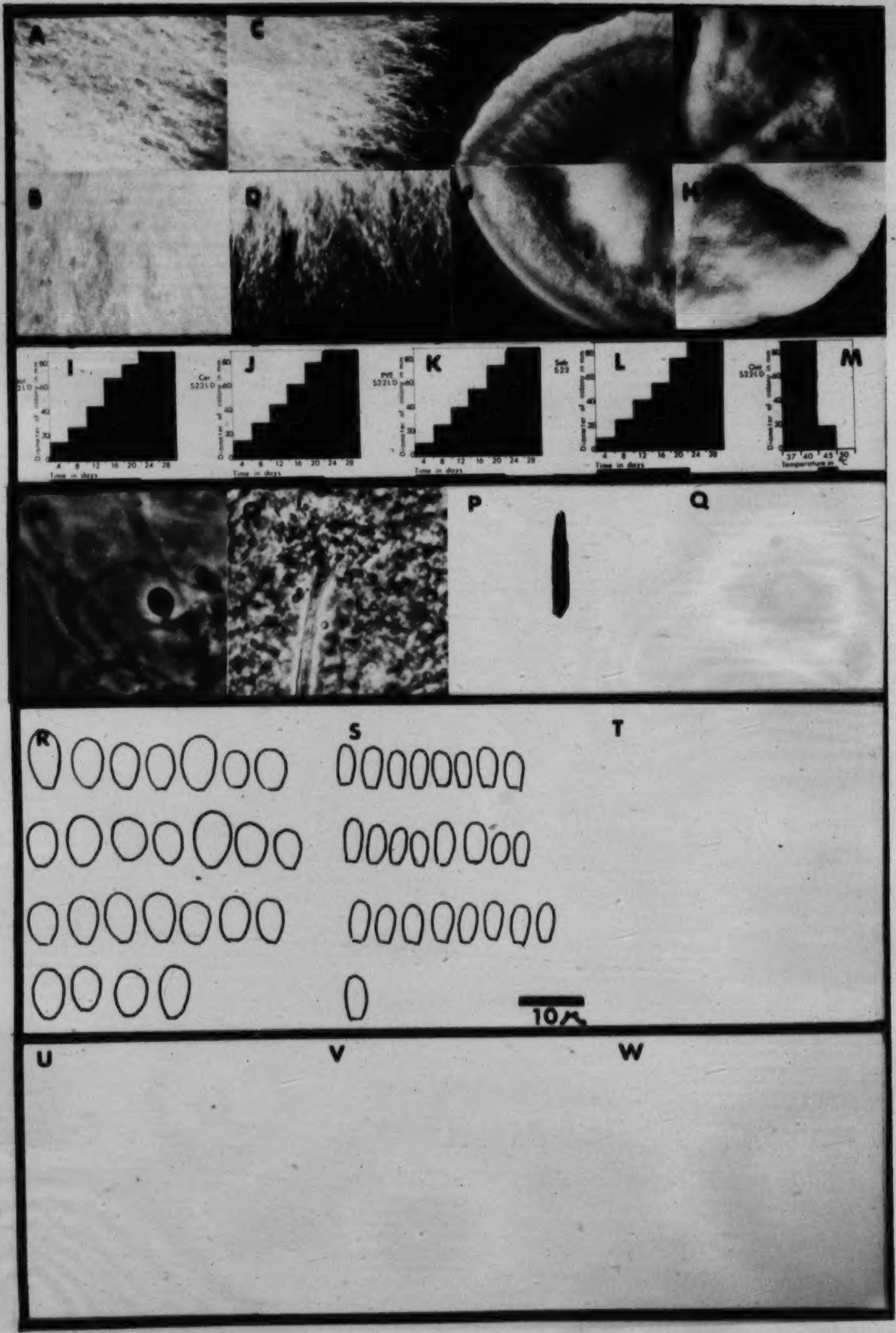

A
C
B
D
H
I
J
K
L
M
Cer
S22LD
PYE
S22LD
Sab
S22
Oat
S22LD
Diameter of colony in mm
Time in days
Temperature in °C
P
Q
R
S
T
10µ
U
V
W

Plate #40: *Petriellidium africanum* UAMH 4000

Isolated from sandy soil, Africa, 1972 by G. Franz

Received 1976 from CBS as *P. africanum* Type CBS 311.72

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Clear/light
     - 2) Cer- Cream tan/none
     - 3) PYE- Gold cream/gold tan
     - 4) Sab- Cream tan/lt. cream tan
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 3.5-6 x 1-2.5 um — Figs. N,R
   - b. Synnematous conidia- 3-5.5 x 1-2 um — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

This is the type strain of *P. africanum*. No other strains have been reported.

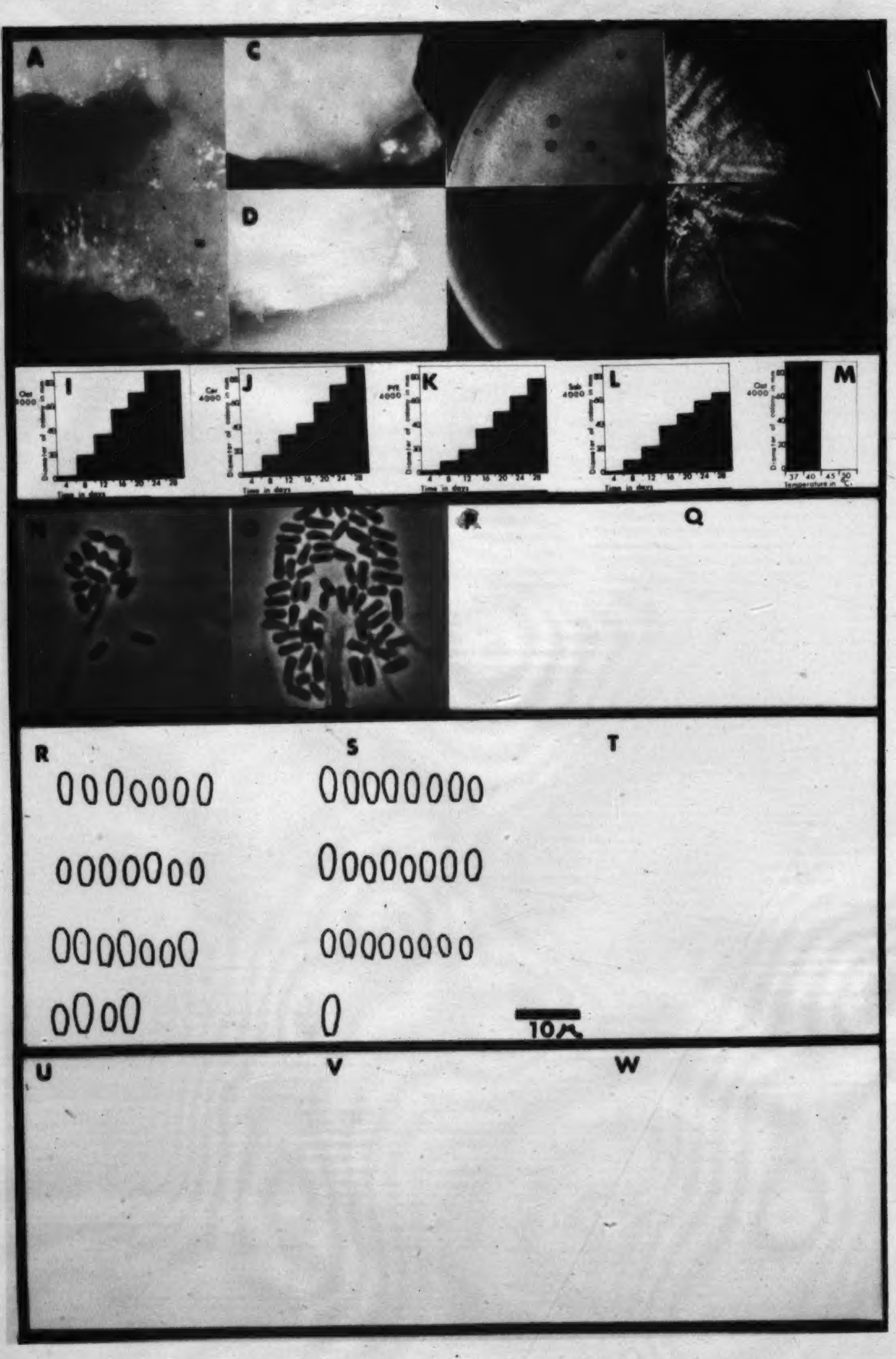

A
C
D
I
Oat 4000
Diameter of colony in mm
Time in days
J
Cer 4000
K
Pfl 4000
L
Sab 4000
M
Temperature in °C.
N
Q
R
S
T
10 μ
U
V
W

Plate #41: *Petriellidium angustum* UAMH 3984

Isolated from sewage half digestion tank, USA, 1972 by D. Malloch

Received 1976 from CBS as *Petriellidium angustum* Type CBS 254.72

1. **Colonies**
    a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    c. Colour at 28 days (Surface/Reverse)
        1) Oat- Lt. mouse brown/light
        2) Cer- Lt. mouse brown/none
        3) PYE- Off white/yellow
        4) Sab- Off white/cream yellow
2. **Growth Rates**
    a. at 25°C on different media — Figs. I-L
    b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    a. Diffuse conidia- 5-7.5 x 2.5-4.5 um — Figs. N,R
    b. Synnematous-like conidia- — Figs. O,S
    c. Ascocarps- 40-68.5 um dia. — Figs. P,U
    d. Ascospores- 5-6.5 x 2.5-3.5 um,golden — Figs. Q,T,V,W
4. **Comments**

This is the type strain of *P. angustum*. It differs from *Petriellidium boydii* mainly in ascospore size. The *Scedosporium* state is identical to that of *Petriellidium boydii*.

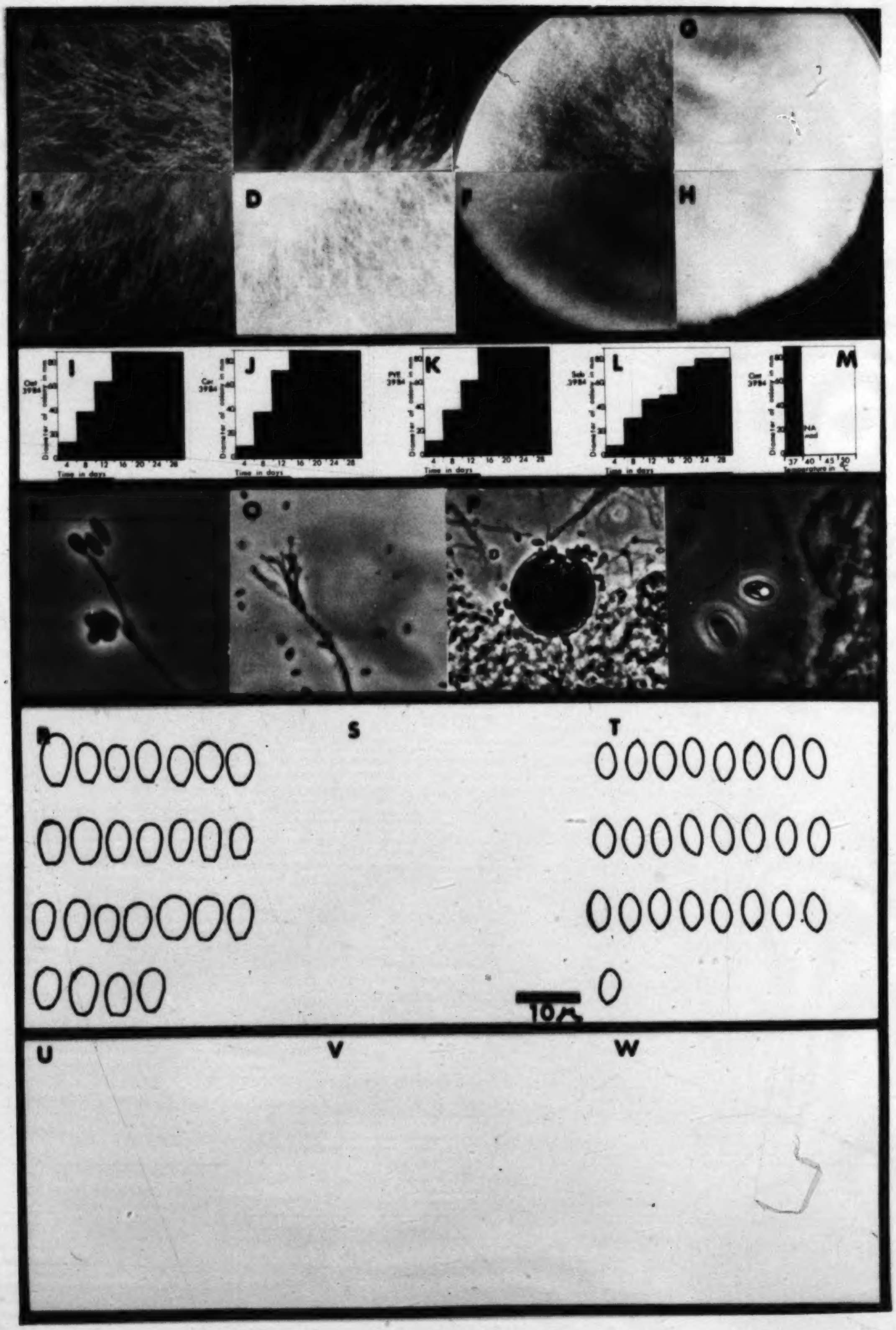

G
D
F
H
I
J
K
L
M
Oat 3984
Cor 3984
PYE 3984
Sab 3984
Oat 3984
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
NA
37
40
45
50
Temperature in °C
O
P
R
S
T
10µ
U
V
W

Plate #42: *Petriellidium angustum* UAMH 1101

Isolated from Brazil nut by Orr

Received 1961 from Orr as *Allescheria boydii* UCLA-M-148

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Mod. mouse brown(mod. grey)/mod.dark
        - 2) Cer- Off white/none
        - 3) PYE- Lt. mouse brown/yellow with a brown ring
        - 4) Sab- Off white/cream
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6.5-10 x 4-6 µm — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- 92-143 µm dia. — Figs. P,U
    - d. Ascospores- 5.5-6.5 x 2-4 µm,golden — Figs. Q,T,V,W
4. **Comments**

    This strain was originally identified as *Petriellidium boydii*

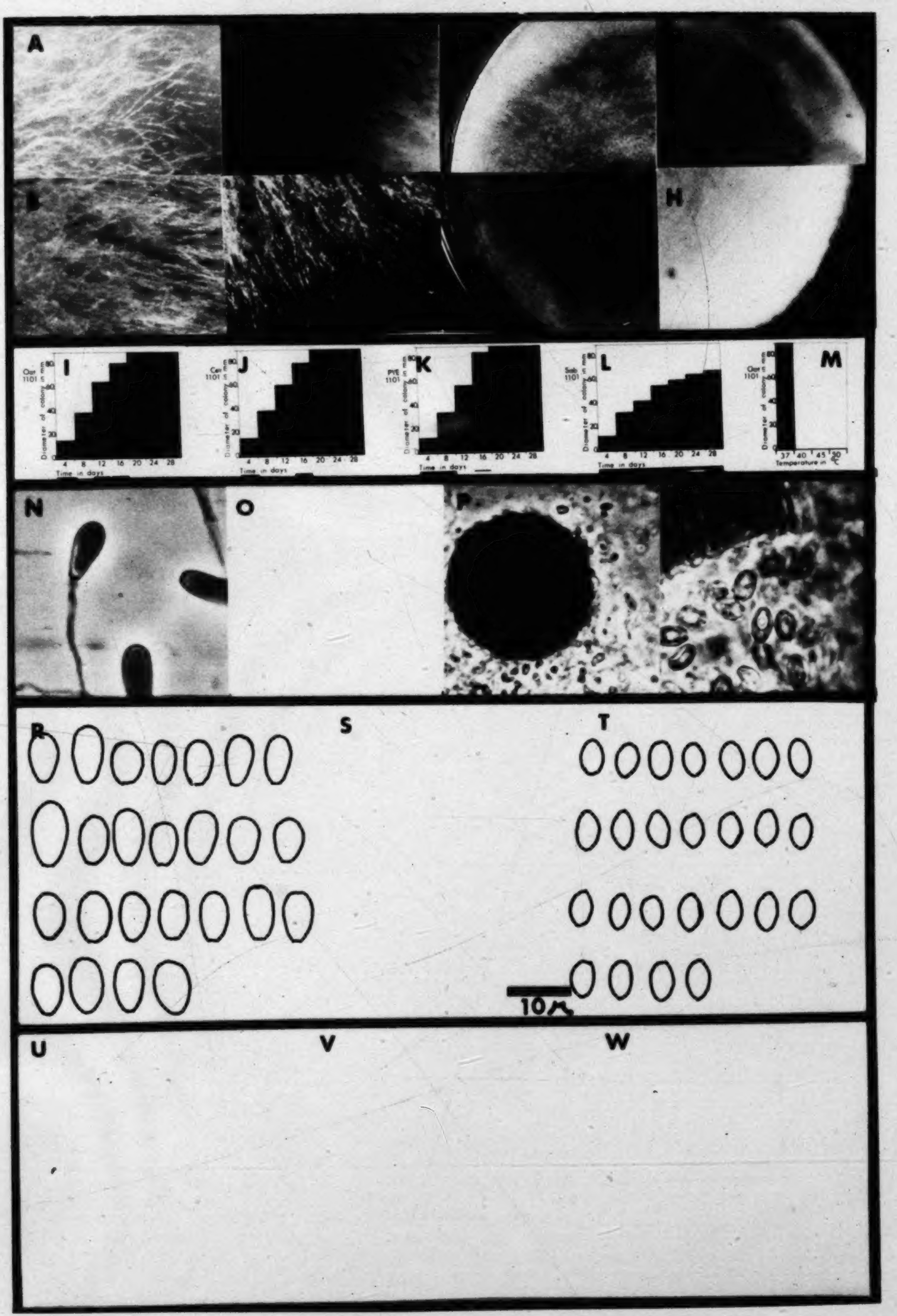

A
H
I
J
K
L
M
Czt 1101
Cer 1101
PYE 1101
Sab 1101
Czt 1101
Diameter of colony mm
0
20
40
60
80
Time in days
4
8
12
16
20
24
28
Temperature in °C
37
40
45
50
N
O
P
R
S
T
10 µ
U
V
W

Plate #43: *Petriellidium angustum* UAMH 3992

Isolated from soil, Surinam, by J. H. van Emden

Received 1976 from CBS as *Petriellidium boydii* CBS 593.73

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. mouse brown/ light
        - 2) Cer- Off white/none
        - 3) PYE- Off white/yellow
        - 4) Sab- Off white/yellow
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5.5-8 x 3-5 µm — Figs. N,R
    - b. Synnematous conidia- 3.5-6 x 1.5-2 µm — Figs. O,S
    - c. Ascocarps- 76 µm dia. — Figs. P,U
    - d. Ascospores- 5-7 x 2-3.5 µm,golden — Figs. Q,T,V,W
4. **Comments**

    This strain was originally identified as *Petriellidium boydii*.

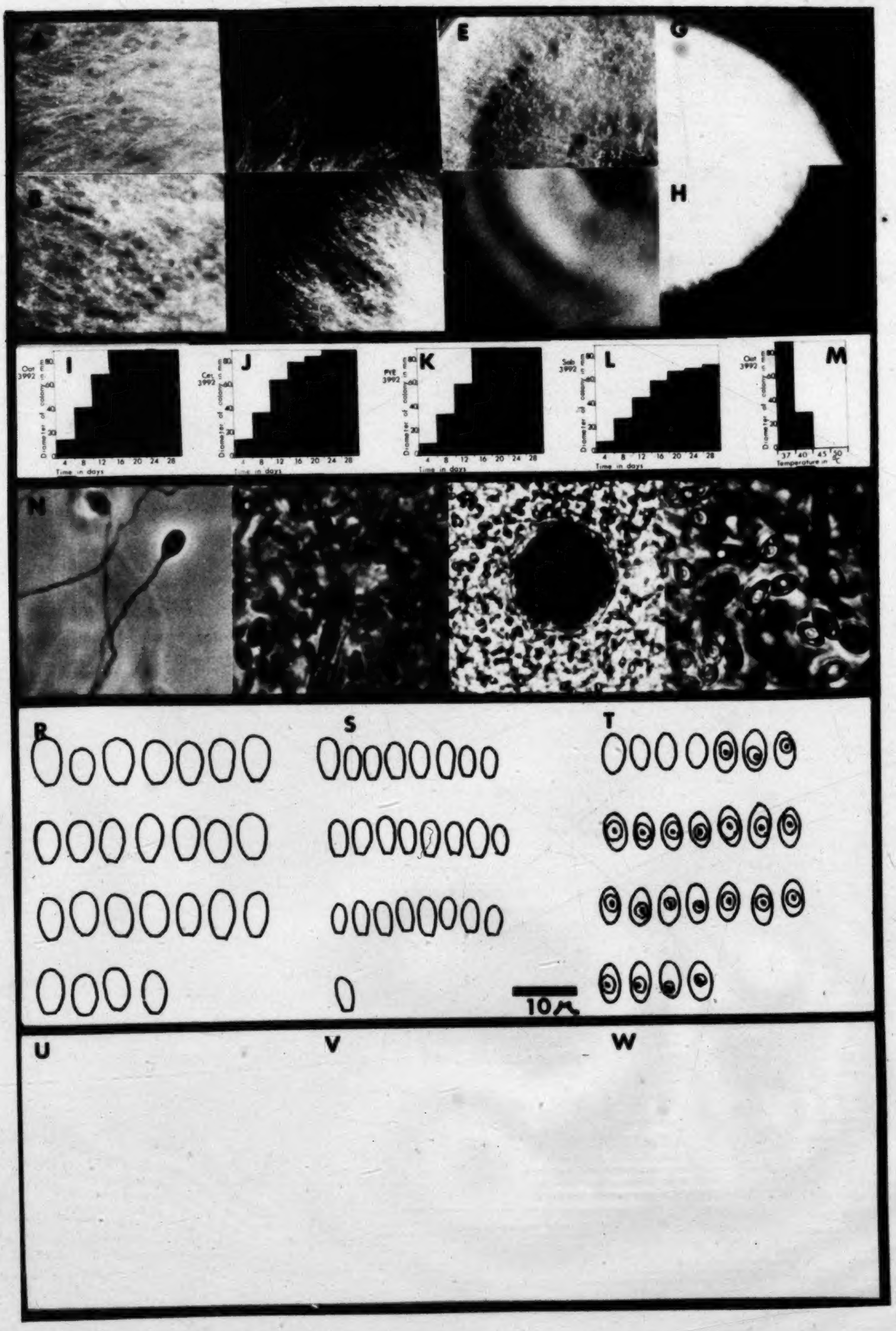

E
G
B
H
Oat 3992
I
J
Cer. 3992
K
PYE 3992
L
Sab 3992
M
Oat 3992
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
R
S
T
10µ
U
V
W

Plate #44: *Petriellidium angustum* UAMH 3997

Isolated from soil, Panama, 1953 by L. Ajello

Received 1976 from CBS as *Petriellidium fusoideum* Type CBS 106.53

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Dark mouse brown/dark
        - 2) Cer- Dark mouse brown/none
        - 3) PYE- Mod. mouse brown-grey/yellow tan
        - 4) Sab- Lt. gray/lt. tan
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5.5-8 x 3-4.5 *um* — Figs. N,R
    - b. Synnematous conidia- 3.5- 6.5 x 1.5-2 *um* — Figs. O,S
    - c. Ascocarps- 65-107.5 *um* dia. — Figs. P,U
    - d. Ascospores- 5.5-7 x 2.5-3.5 *um*,golden — Figs. Q,T,V,W
4. **Comments**

This strain was originally identified as *A. boydii* but von Arx later reclassified it as *P. fusoideum*.

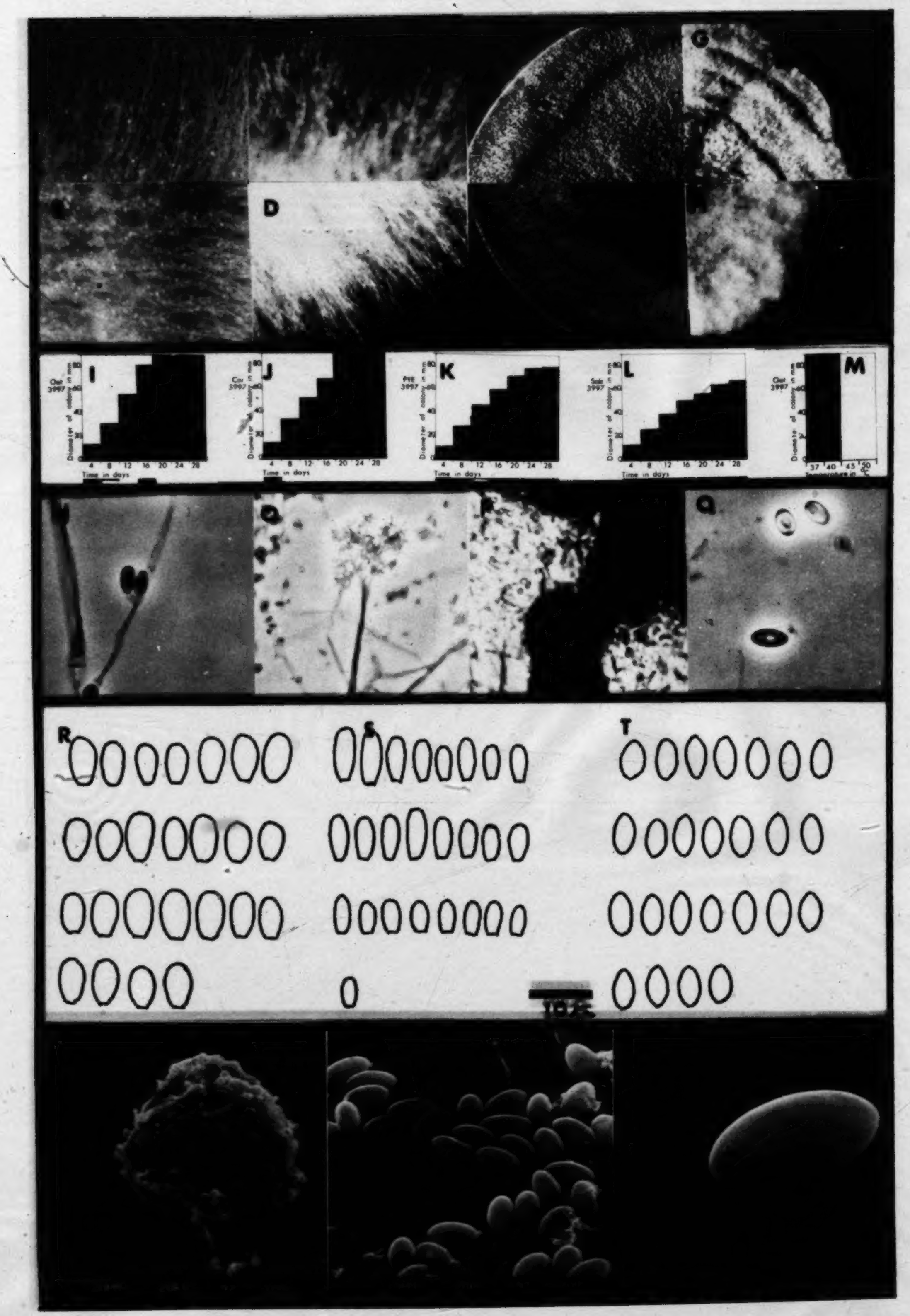

G
D
I
J
K
L
M
Oat 3997
Cor 3997
PYE 3997
Sab 3997
Oat 3997
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
O
P
Q
R
S
T

Plate #45: *Petriellidium desertorum* UAMH 3993

Isolated from salt marsh soil, Kuwait, 1972 by A. F. Moustafa

Received 1976 from CBS as *Petriellidium desertorum* Type CBS 489.72

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Off white/light
        - 2) Cer- Off white/none
        - 3) PYE- Off white/dark tan
        - 4) Sab- White/cream yellow
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 4-8 x 1.5-4 um — Figs. N,R
    - b. Synnematous conidia- not seen
    - c. Brown chlamydospores- 10-15 x 7.5-13 um — Figs. O,S
    - d. Ascocarps- 68.5-108.5 um dia. — Figs. P,U
    - e. Ascospores- 11-14 x 7-8 um,golden — Figs. Q,T,V,W
4. **Comments**

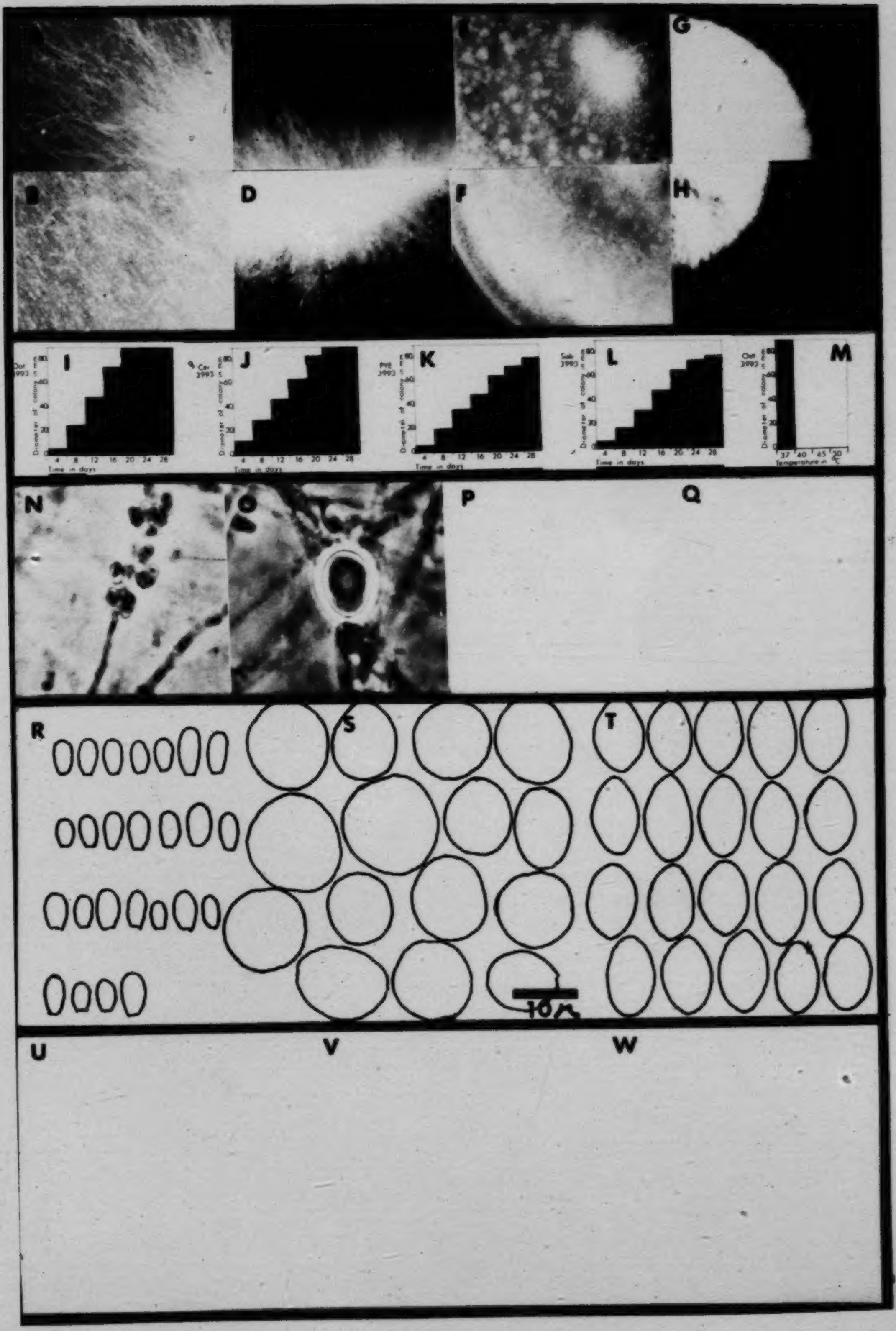

G
B
D
F
H
I
Oat
3993
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer
3993
Diameter of colony in mm
Time in days
K
PYE
3993
Diameter of colony in mm
Time in days
L
Sab
3993
Diameter of colony in mm
Time in days
M
Oat
3993
Diameter of colony in mm
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10µ
U
V
W

Plate #46: *Petriellidium fimeti* UAMH 4257

Isolated from dung of nilgai, India, by K. G. Mukerji
Received 1979 from CBS as *Petriellidium fimeti* Type CBS 129.78 mixed with *Pithoascus langeronii*

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Lt. mouse brown/light
        - 2) Cer- Lt. grey/slight orange
        - 3) PYE- Mod. grey/dark brown
        - 4) Sab- Dark olive green/dark olive green
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- not seen — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- 81.5-225 μm dia. — Figs. P,U
    - d. Ascospores- 10-13 x 7-9 μm,golden — Figs. Q,T,V,W
4. **Comments**

The ascospores of this strain germinated from both germ pores.

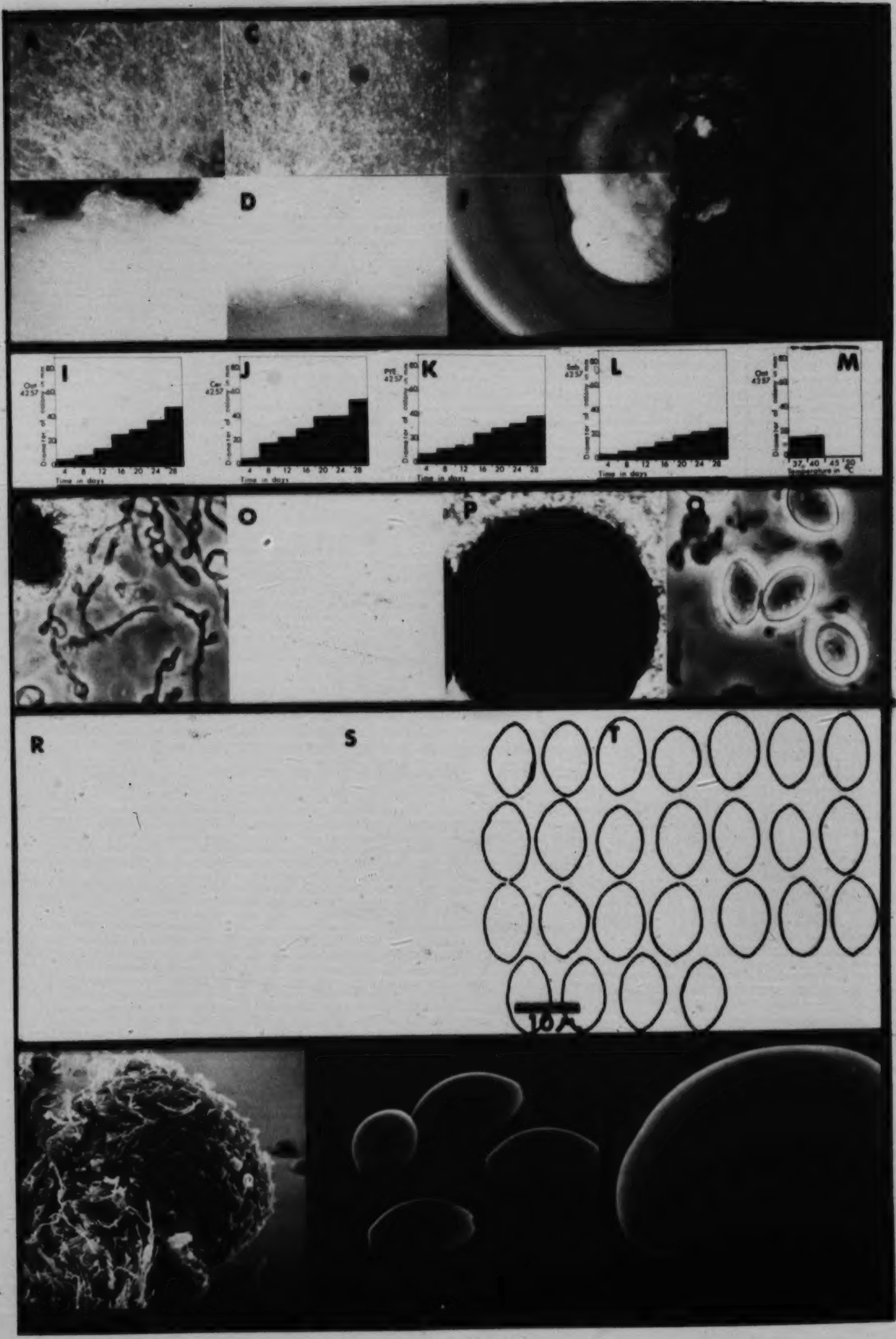

A
C
D
I
J
K
L
M
Oat 4257
Cer 4257
PYE 4257
Sab 4257
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
O
P
Q
R
S
T
10μ

Plate #47: *Petriella guttulata* UAMH 3996

Isolated from partridge dung, by G. L. Barron

Received 1976 from CBS *Petriella guttulata* CBS 362.61

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Clear with lt. mouse brown ring/light
        - 2) Cer- Off white/none
        - 3) PYE- Cream yellow green/yellow green
        - 4) Sab- Cream/cream
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 4-7 x 1-3 μm — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

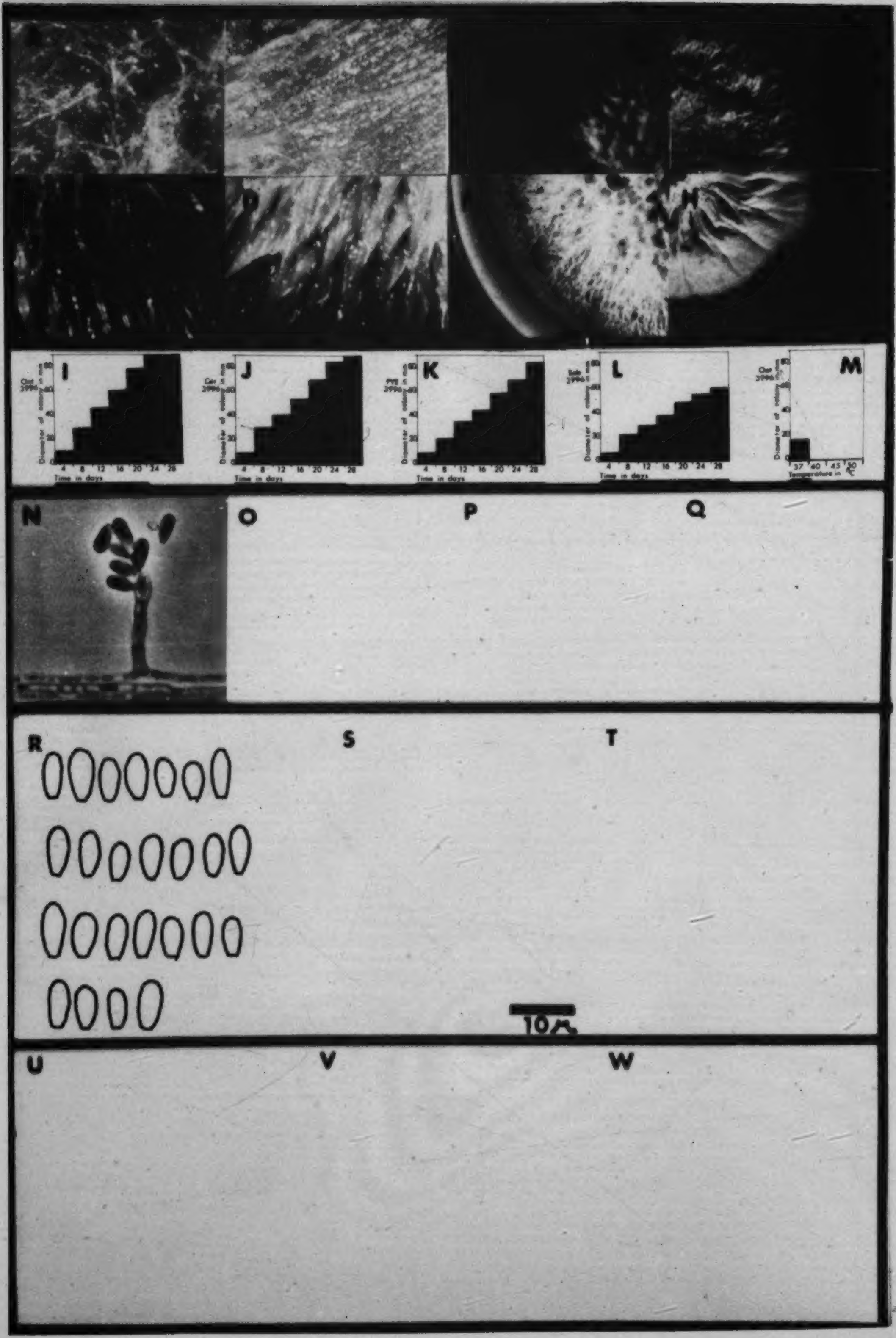

I
Oat 3996
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer 3996
K
PYE 3996
L
Sab 3996
M
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10 μ
U
V
W

Plate #48: *Petriella lindforsii* UAMH 3999

Isolated

Received 1976 from CBS as *Petriella lindforsii* CBS 352.59

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Clear/light
        - 2) Cer- Camel/none
        - 3) PYE- Cream yellow/yellow
        - 4) Sab- Cream pale yellow/cream
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 5-8 x 2.5-4 um — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- measurement not available — Figs. P,U
    - d. Ascospores- 8-9.5 x 3.5-5 um,golden — Figs. Q,T,V,W
4. **Comments**

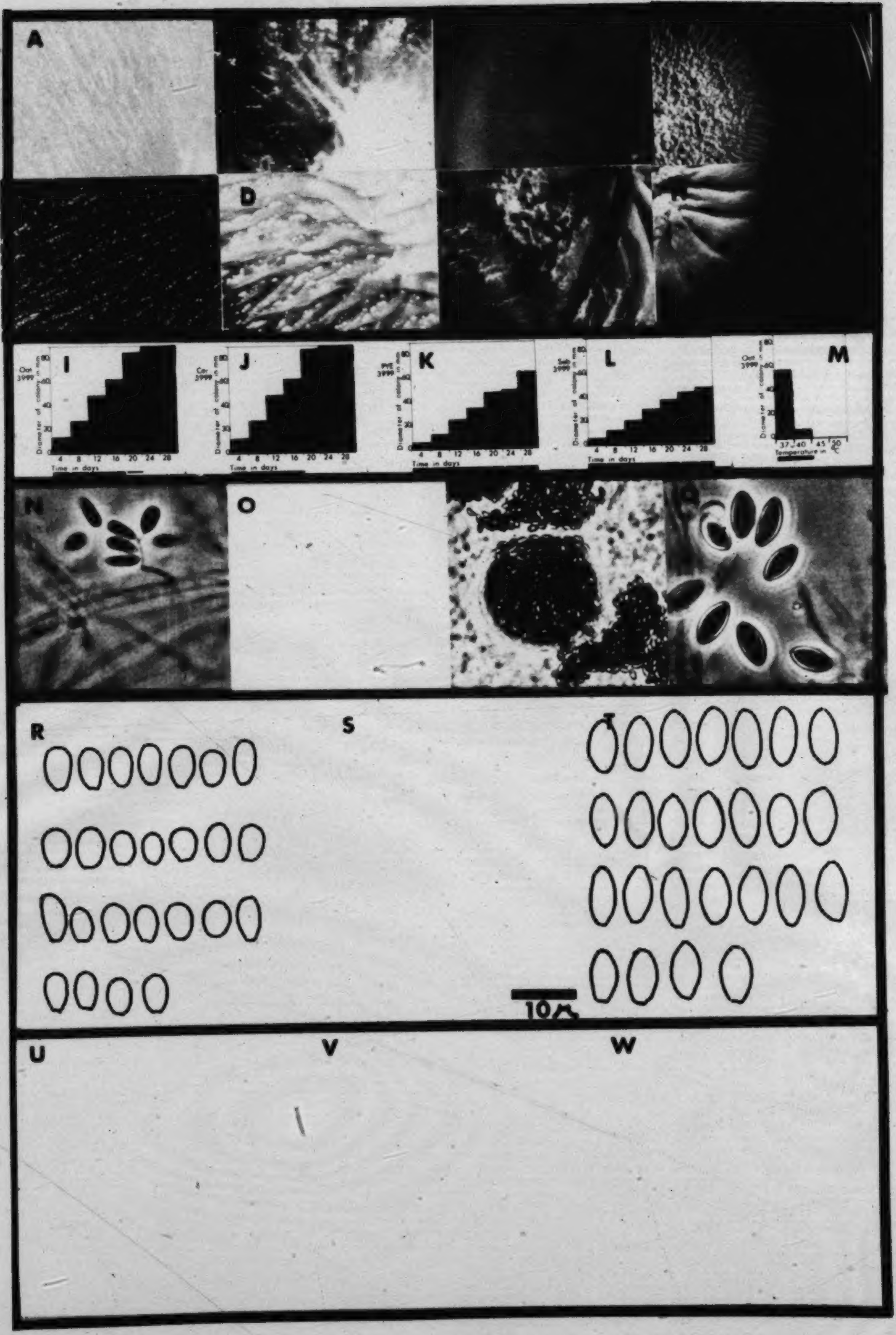

A
D
I
Oat
3999
Diameter of colony in mm
Time in days
J
Cor
3999
K
PYE
3999
L
Sab
3999
M
Temperature in °C
N
O
R
S
T
10µ
U
V
W

Plate #49: *Petriella musispora* UAMH 3986

Isolated from wood, by D. Malloch

Received 1976 from CBS as *Petriella musispora* Type CBS 745.69

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Lt. grey-green/light
     - 2) Cer- Lt.grey/none
     - 3) PYE- Pale cream yellow/yellow
     - 4) Sab- Pale green/lt. cream green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 4.5-8.5 x 1-2 um — Figs. N,R
   - b. Chlamydospores — Figs. O,S
   - c. Ascocarps- not seen — Figs. P,U
   - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

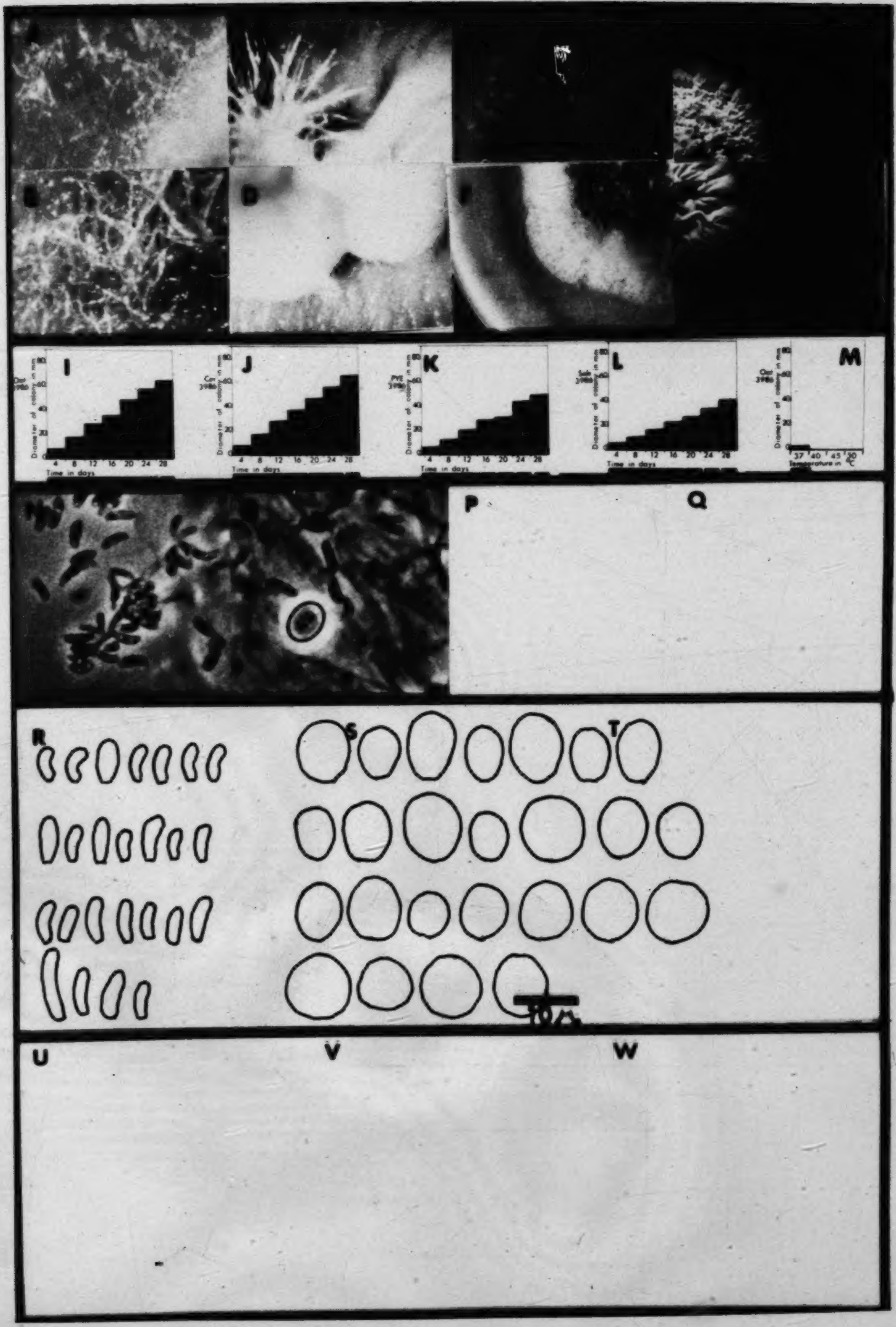

B
D
I
J
K
L
M
Oat 3986
Czr 3986
PYE 3986
Sab 3986
Oat 3986
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
P
Q
R
S
T
10 μ
U
V
W

Plate #50: *Petriella setifera* UAMH 1662

Isolated as contaminant, Edmonton, 1963 by J. W. Carmichael

Entered 1963 as *Petriella setifera*

1. **Colonies**
   a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   c. Colour at 28 days (Surface/Reverse)
      1) Oat- Clear with lt. mouse brown ring/light
      2) Cer- Off white with mouse brown/none
      3) PYE- Mod. mouse brown/yellow green
      4) Sab- Cream yellow tan/cream lt. tan
2. **Growth Rates**
   a. at 25°C on different media — Figs. I-L
   b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   a. Diffuse conidia- 6-9.5 x 3-4.5 um — Figs. N,R
   b. Synnematous conidia- 6-12 x 2 4.5 um — Figs. O,S
   c. Ascocarps- 50-123 um dia. — Figs. P,U
   d. Ascospores- 8-11 x 4-5 um,golden — Figs. Q,T,V,W
4. **Comments**

This is not the type strain, however the type strain no longer produces ascospores. Three additional strains were included in the quantitative analysis: UAMH 805, UAMH 1924 from Tokyo soil, and UAMH 2702 from corn field soil.

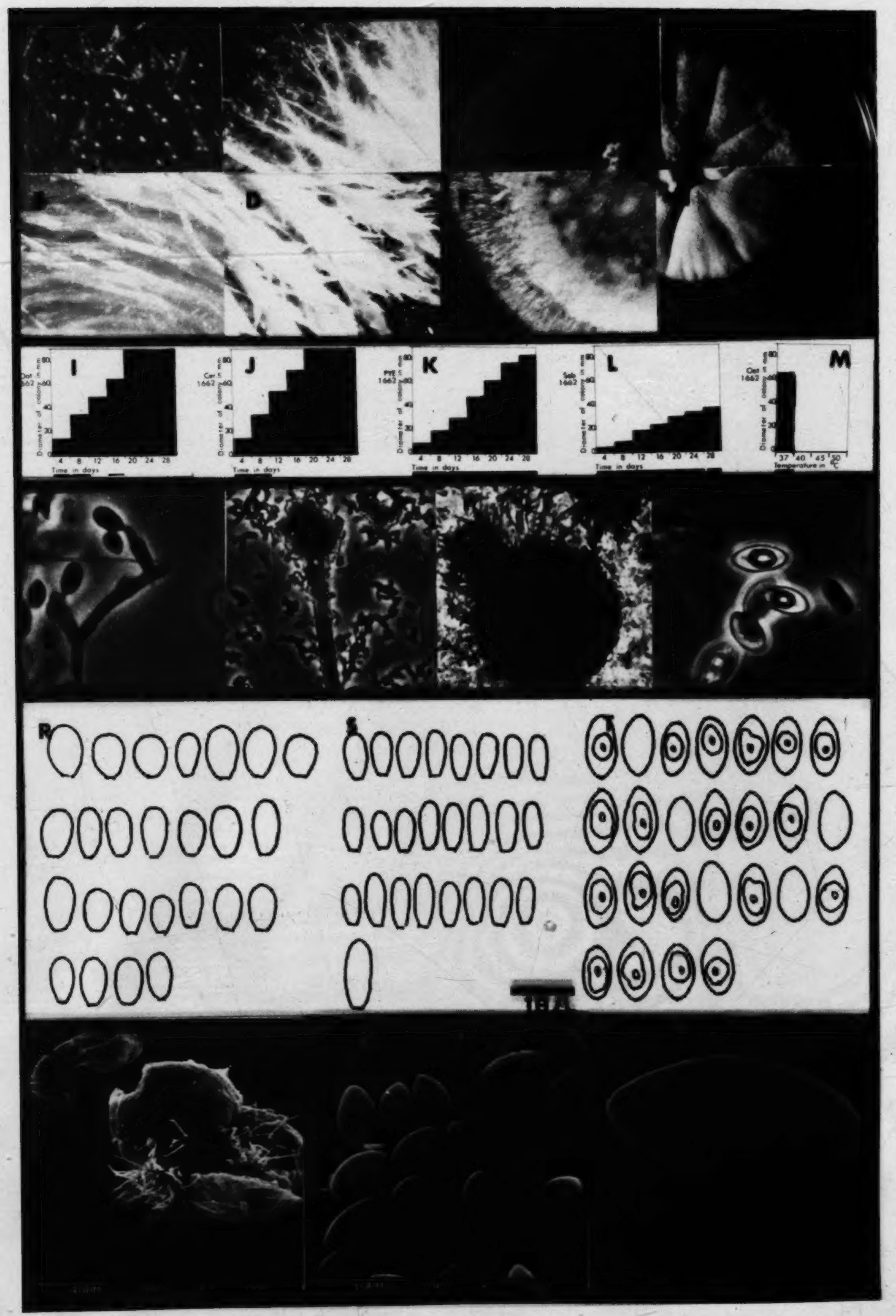

D
I
Oat 1662
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer 1662
Diameter of colony in mm
Time in days
K
PYE 1662
Diameter of colony in mm
Time in days
L
Sab 1662
Diameter of colony in mm
Time in days
M
Oat 1662
Diameter of colony in mm
37
40
45
50
Temperature in °C
R
S
T

Plate #51: *Petriella sordida* UAMH 1410

Isolated from *Chrysanthemum*, Ottawa, 1958 by H. S. Thompson

Received 1962 from Thompson as *Petriella asymmetrica*

1. **Colonies**
   a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   c. Colour at 28 days (Surface/Reverse)
      1) Oat- Pale green-grey/light
      2) Cer- Lt beige(pale green)/none
      3) PYE- Pale cream yellow/cream yellow
      4) Sab- Cream/cream
2. **Growth Rates**
   a. at 25°C on different media — Figs. I-L
   b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   a. Diffuse conidia- 4-7 x 2-4 *u*m — Figs. N,R
   b. Synnematous conidia- not seen — Figs. O,S
   c. Ascocarps- 128 *u*m dia. — Figs. P,U
   d. Ascospores- 8-10 x 3-5 *u*m,golden — Figs. Q,T,V,W
4. **Comments**

This is not the type strain, however because the type no longer produces ascospores, this strain was illustrated. Two additional strains were included in the quantitative analysis: UAMH 3983 from *Pyrus communis* and UAMH 3985 from soil in mixed wood.

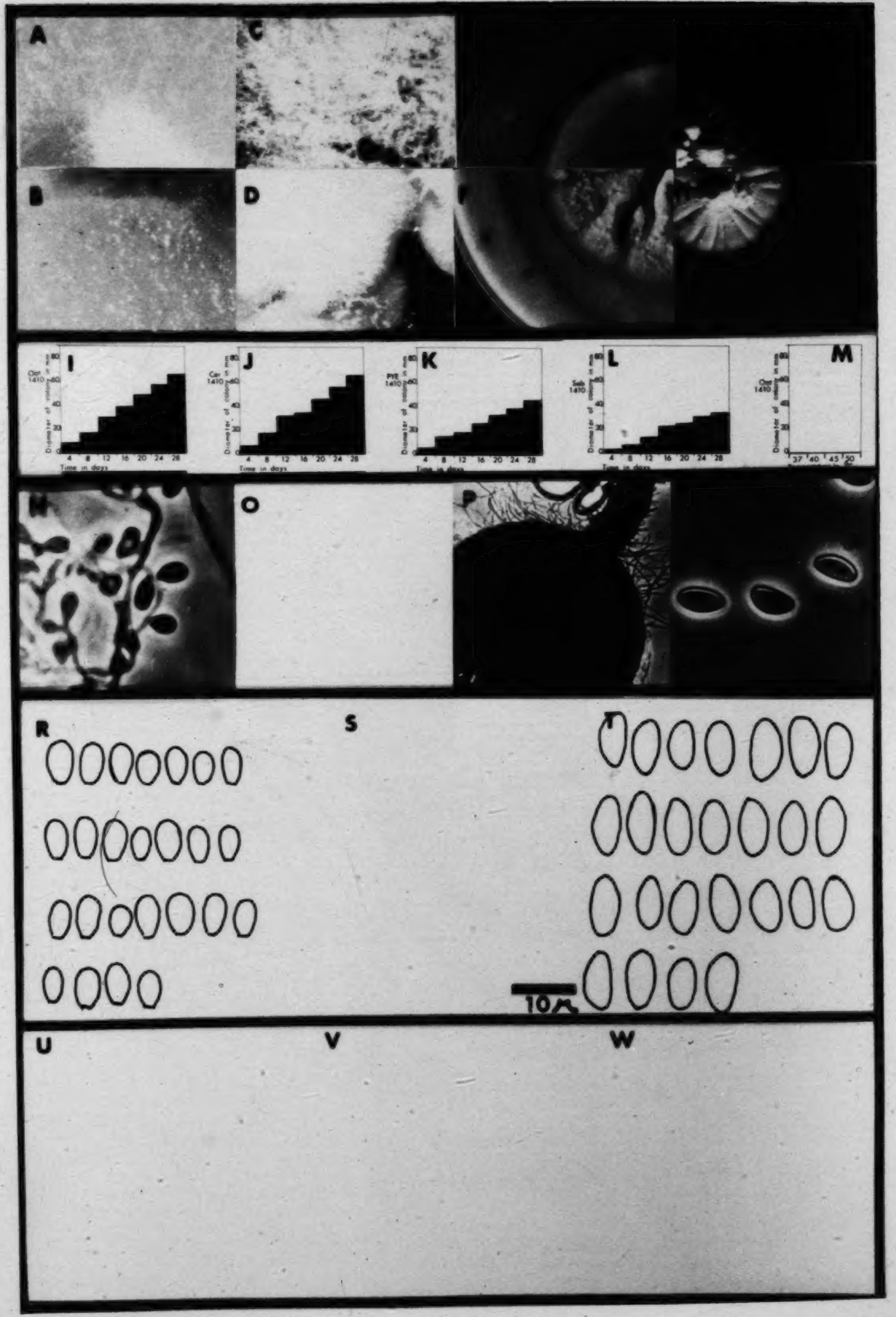

A
B
C
D
I
J
K
L
M
Czt
1410
Car
1410
PYE
1410
Sab
1410
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
N
O
P
R
S
T
10μ
U
V
W

Plate #52: *Microascus desmosporus* UAMH 966

Isolated 1959

Received 1961 from CBS as *Microascus cirrosus* St. Domsch

1. **Colonies**
    a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    c. Colour at 28 days (Surface/Reverse)
        1) Oat- Dark grey/light
        2) Cer- Dark olive green/none
        3) PYE- Mod. mouse brown-grey/cream lt. olive green
        4) Sab- Lt. cream olive green/lt. cream olive green
2. **Growth Rates**
    a. at 25°C on different media — Figs. I-L
    b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    a. Diffuse conidia- 3-5 x 2-4 um — Figs. N,R
    b. Synnematous conidia- not seen — Figs. O,S
    c. Ascocarps- 97.5-163.5 um dia. — Figs. P,U
    d. Ascospores- 4-6 x 2.5-4 um,red — Figs. Q,T,V,W
4. **Comments**

Also one strain from the wood samples was included in the quantitative analysis.

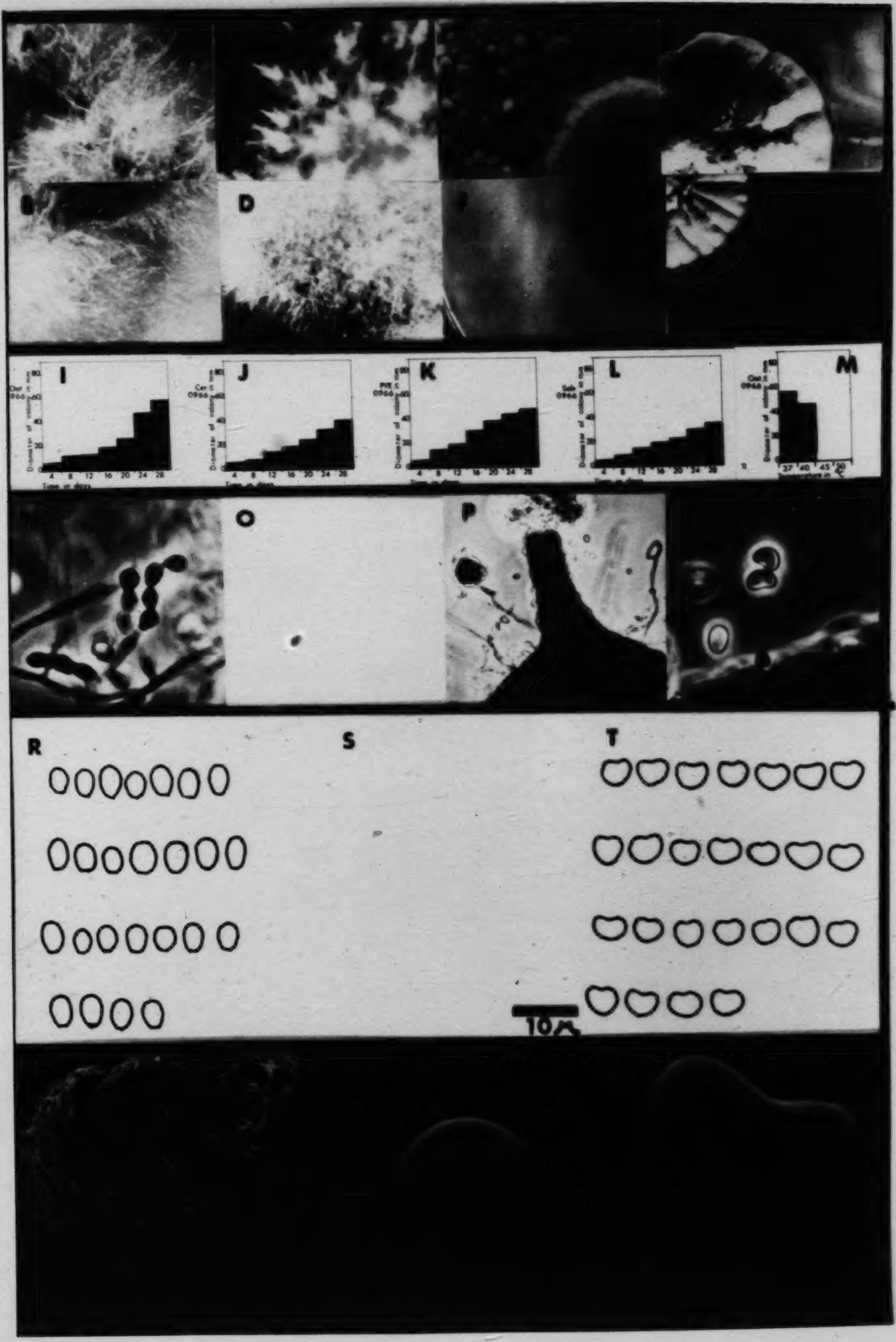

A
B
D
I
J
K
L
M
O
P
R
S
T
Oat 5 0966
Cer 5 0966
PYE 5 0966
Sab 0966
Oat 5 0966
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
10µ

Plate #53: *Microascus intermedius* UAMH 2469

Isolated from hair, Edmonton, 1965 by J. W. Carmichael

Entered 1965 as *Microascus intermedius* My 925-65

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Cream/light
     - 2) Cer- Dark lime green/none
     - 3) PYE- Mod. grey-olive green/cream lt. green
     - 4) Sab- Dark olive green/mod. olive green
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- not seen — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- 132-192 *um* dia. — Figs. P,U
   - d. Ascospores- 4-6 x 1.5-2.5 *um*,red — Figs. Q,T,V,W
4. **Comments**

   Von Arx reclassified this species as *Pithoascus intermedius*; however, from the results of this study it should remain in *Microascus*.

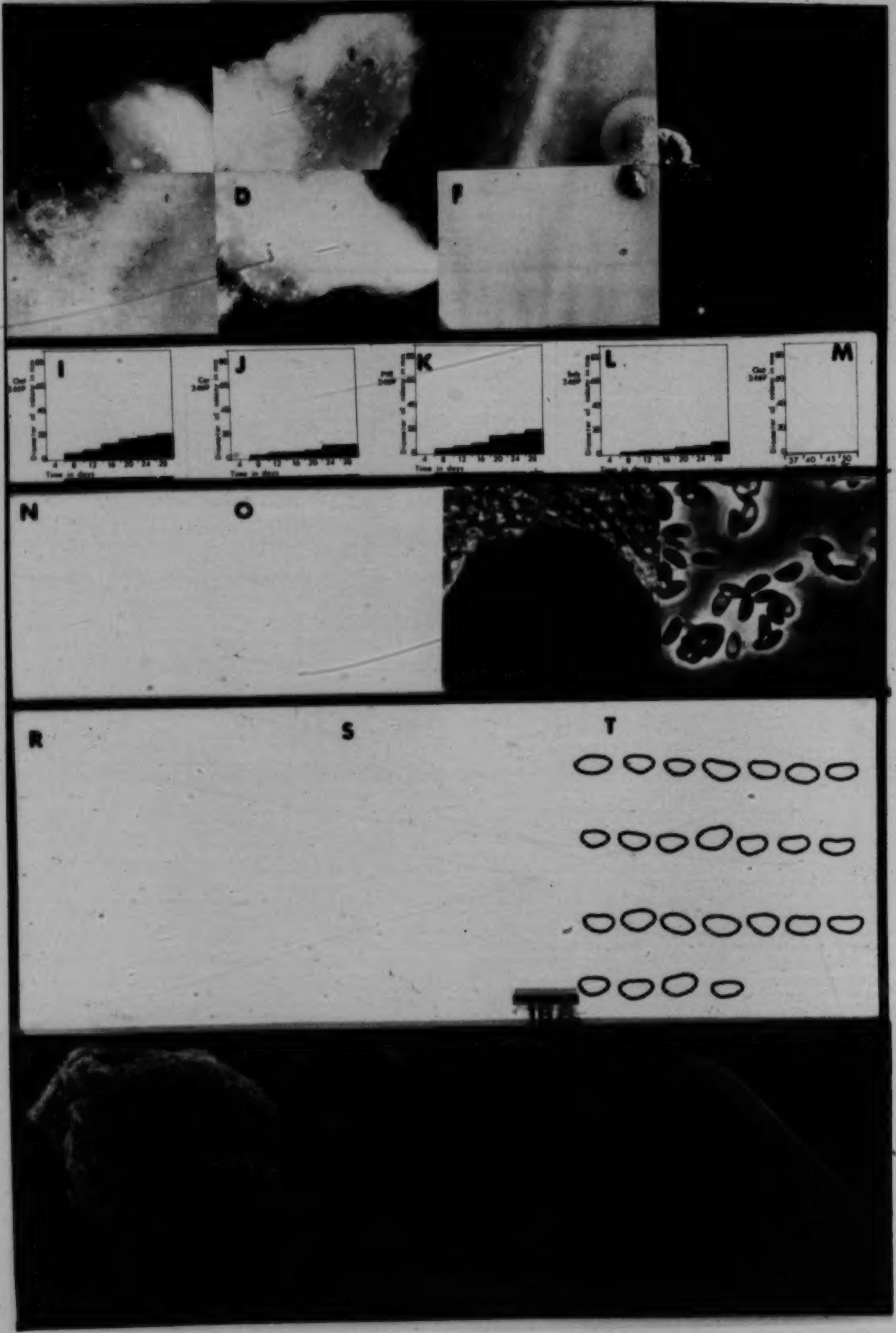

D
F
I
J
K
L
M
4
8
12
16
20
24
28
Time in days
37
40
45
50
N
O
R
S
T

Plate #54: *Microascus longirostris* UAMH 408

Isolated from finger nails, Edmonton, 1955 by J. W. Carmichael

Entered 1955 as *Microascus longirostris* P5407

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Off white/light
        - 2) Cer- Off white/none
        - 3) PYE- Off white/cream
        - 4) Sab- Off white/tan
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- not seen — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- not seen — Figs. P,U
    - d. Ascospores- not seen — Figs. Q,T,V,W
4. **Comments**

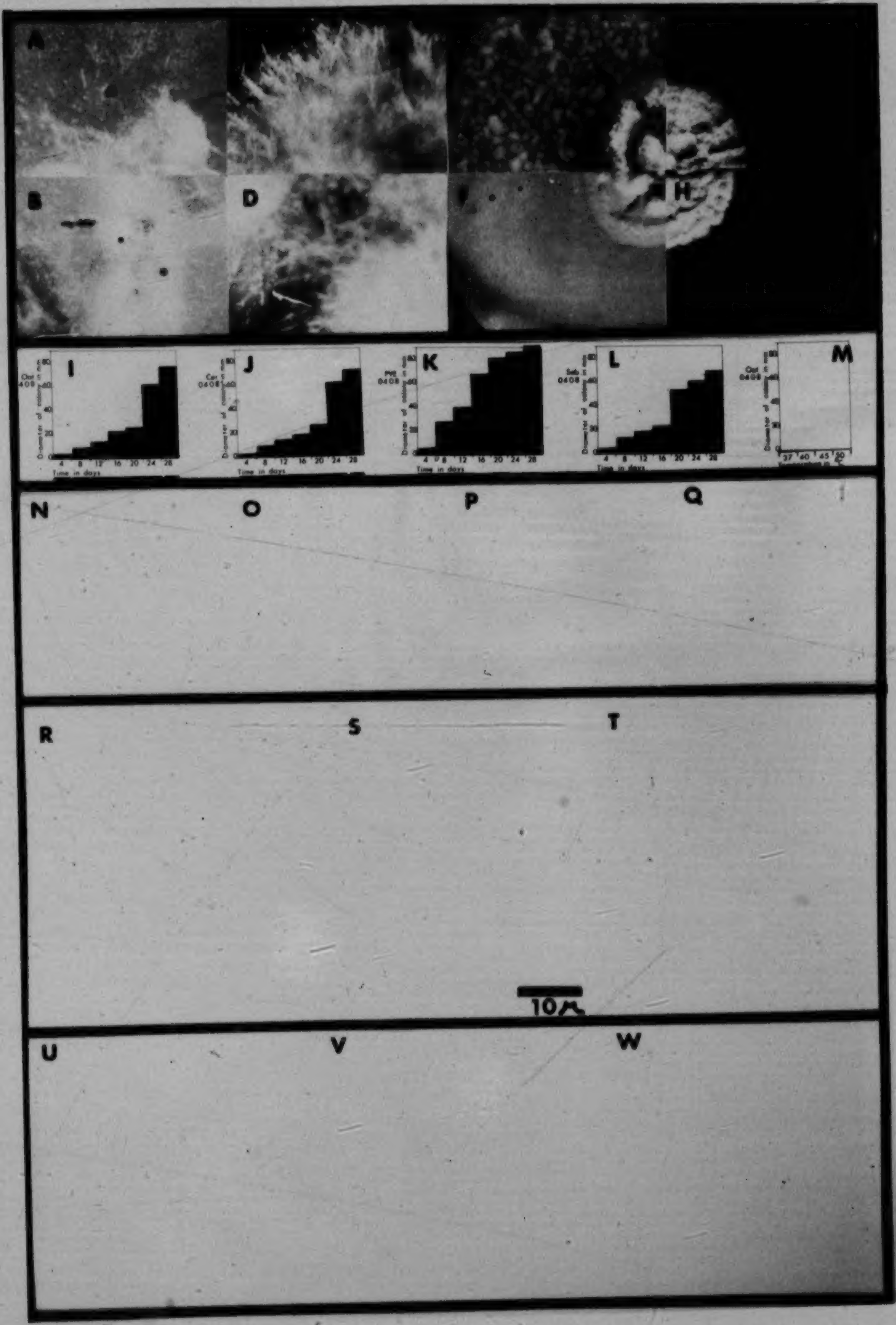

A
B
D
H
I
J
K
L
M
Oat S 0408
Cer S 0408
PYE S 0408
Sab S 0408
Oat 0408
Diameter of colony mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
O
P
Q
R
S
T
10µ
U
V
W

Plate #55: *Microascus manginii* UAMH 2642

Isolated from chicken litter, Guelph, 1966 by G. Barron

Received 1966 from Barron as *Microascus manginii* 10490

1. **Colonies**
    a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    c. Colour at 28 days (Surface/Reverse)
        1) Oat- Off white/light
        2) Cer- Lt. slimy grey center rest lt. grey/none
        3) PYE- Lt. grey/gold
        4) Sab- White/cream
2. **Growth Rates**
    a. at 25°C on different media — Figs. I-L
    b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    a. Diffuse conidia- 6.5-8.5 x 5-8 μm — Figs. N,R
    b. Synnematous conidia- not seen — Figs. O,S
    c. Ascocarps- 161-232.5 μm dia. — Figs. P,U
    d. Ascospores- 4.5-6 x 3-4 μm,red — Figs. Q,T,V,W
4. **Comments**

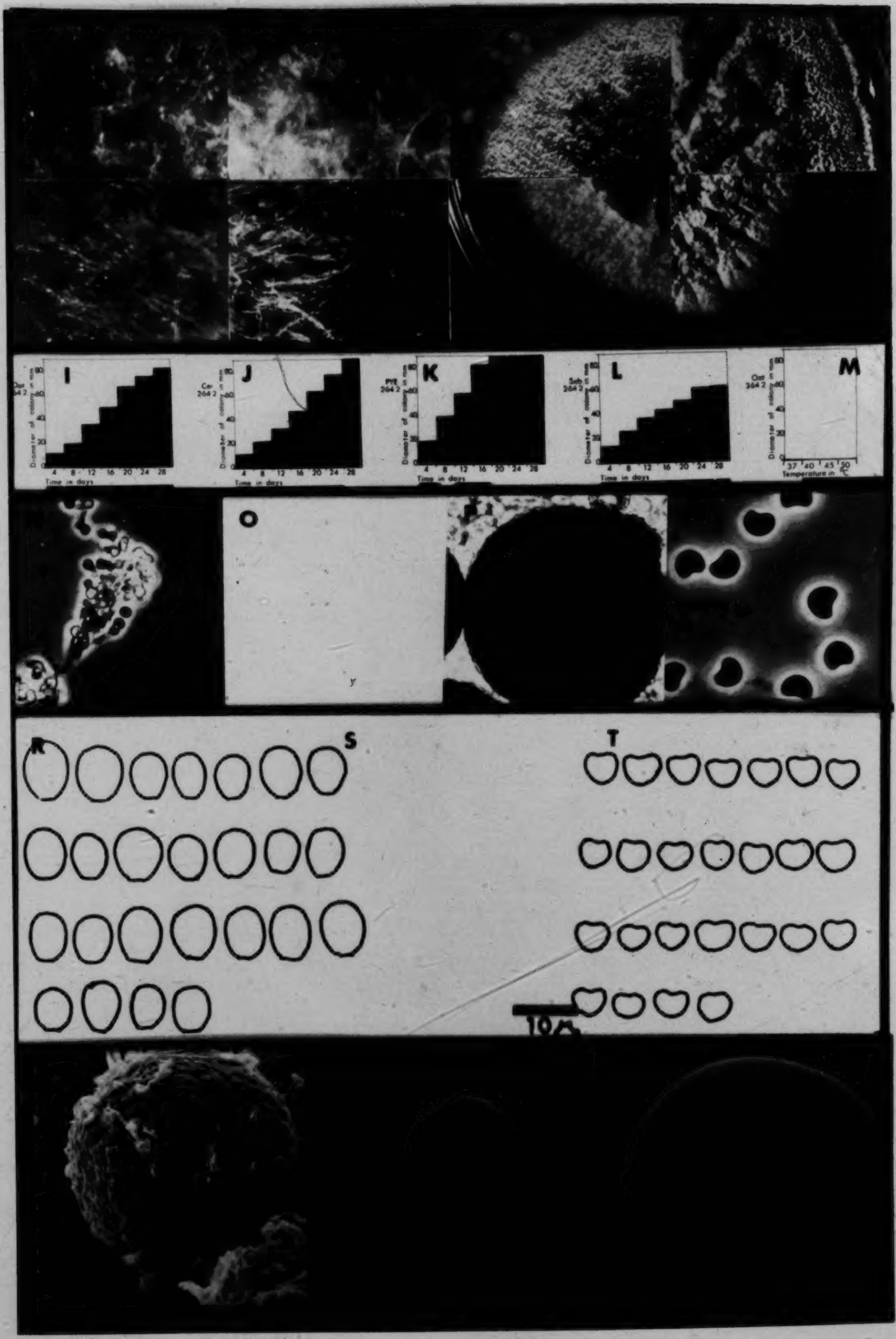

I
Oat 264 2
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
J
Cer 264 2
K
PYE 264 2
L
Sab 264 2
M
Oat 264 2
37
40
45
50
Temperature in °C
O
R
S
T
10µ

Plate #56: *Microascus singularis* UAMH 2637

Isolated 1966 by G. Barron

Received 1966 from Barron as *Microascus doguetti* 10484

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Cream/light
     - 2) Cer- Off white/none
     - 3) PYE- Cream green/gold brown
     - 4) Sab- Cream/cream
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 4.5-6 x 2.5-3.5 um — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- measurement not available — Figs. P,U
   - d. Ascospores- 4.5-6 x 3-5 um,red — Figs. Q,T,V,W
4. **Comments**

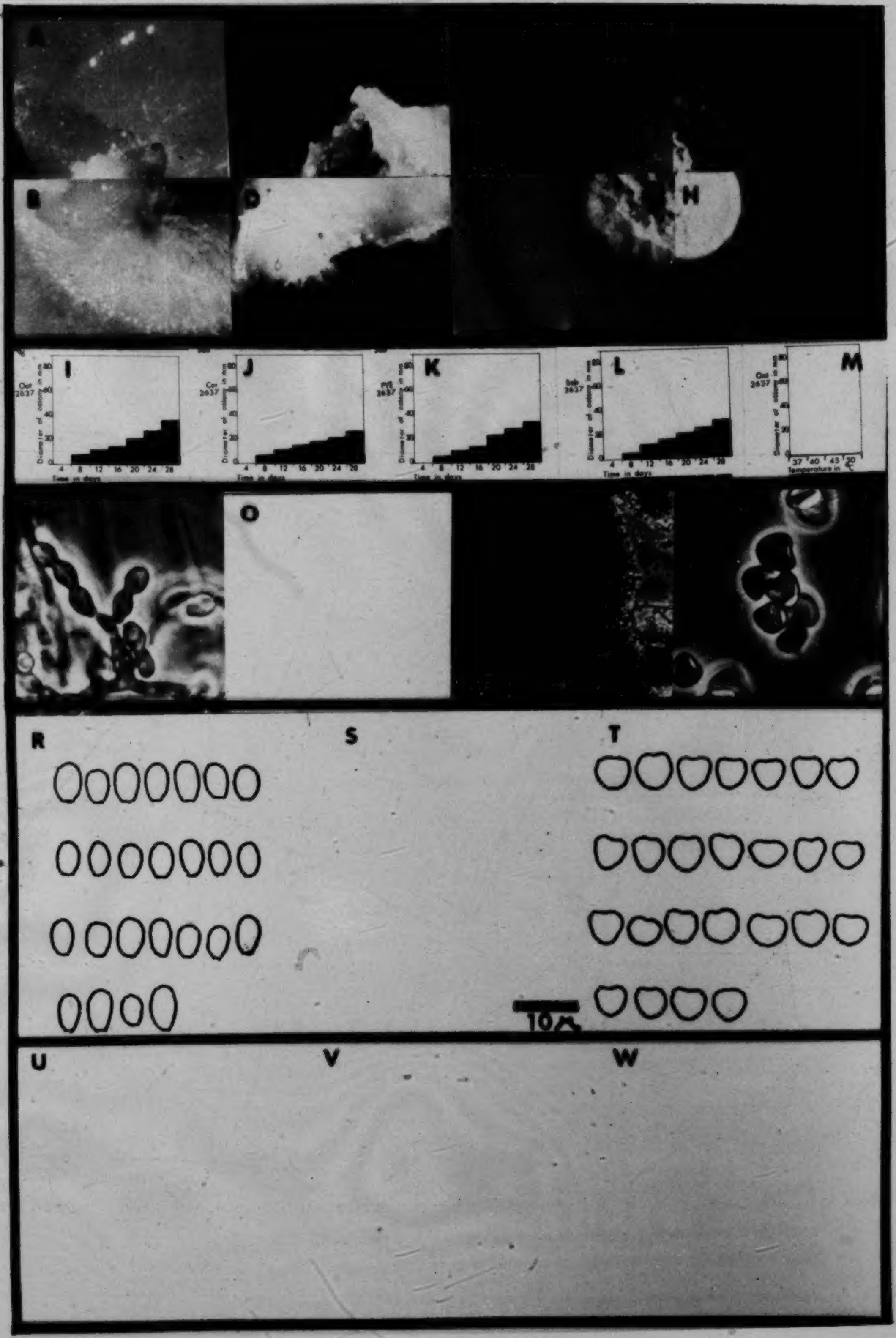

A
B
D
H
I
J
K
L
M
Oat 2637
Corn 2637
PYE 2637
Sab 2637
Oat 2637
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
O
R
S
T
10 μ
U
V
W

Plate #57: *Microascus trigonosporus* UAMH 655

Isolated

Received 1959 from CBS as *Microascus trigonosporus* CBS strain Whitehead 3

1. **Colonies**
   - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
   - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
   - c. Colour at 28 days (Surface/Reverse)
     - 1) Oat- Cream/light
     - 2) Cer- Lt. grey/none
     - 3) PYE- Cream/cream gold
     - 4) Sab- Cream/cream
2. **Growth Rates**
   - a. at 25°C on different media — Figs. I-L
   - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
   - a. Diffuse conidia- 3.5-5 x 2-2.5 μm — Figs. N,R
   - b. Synnematous conidia- not seen — Figs. O,S
   - c. Ascocarps- measurement not available — Figs. P,U
   - d. Ascospores- 4-5.5 x 3-4 μm,red — Figs. Q,T,V,W
4. **Comments**

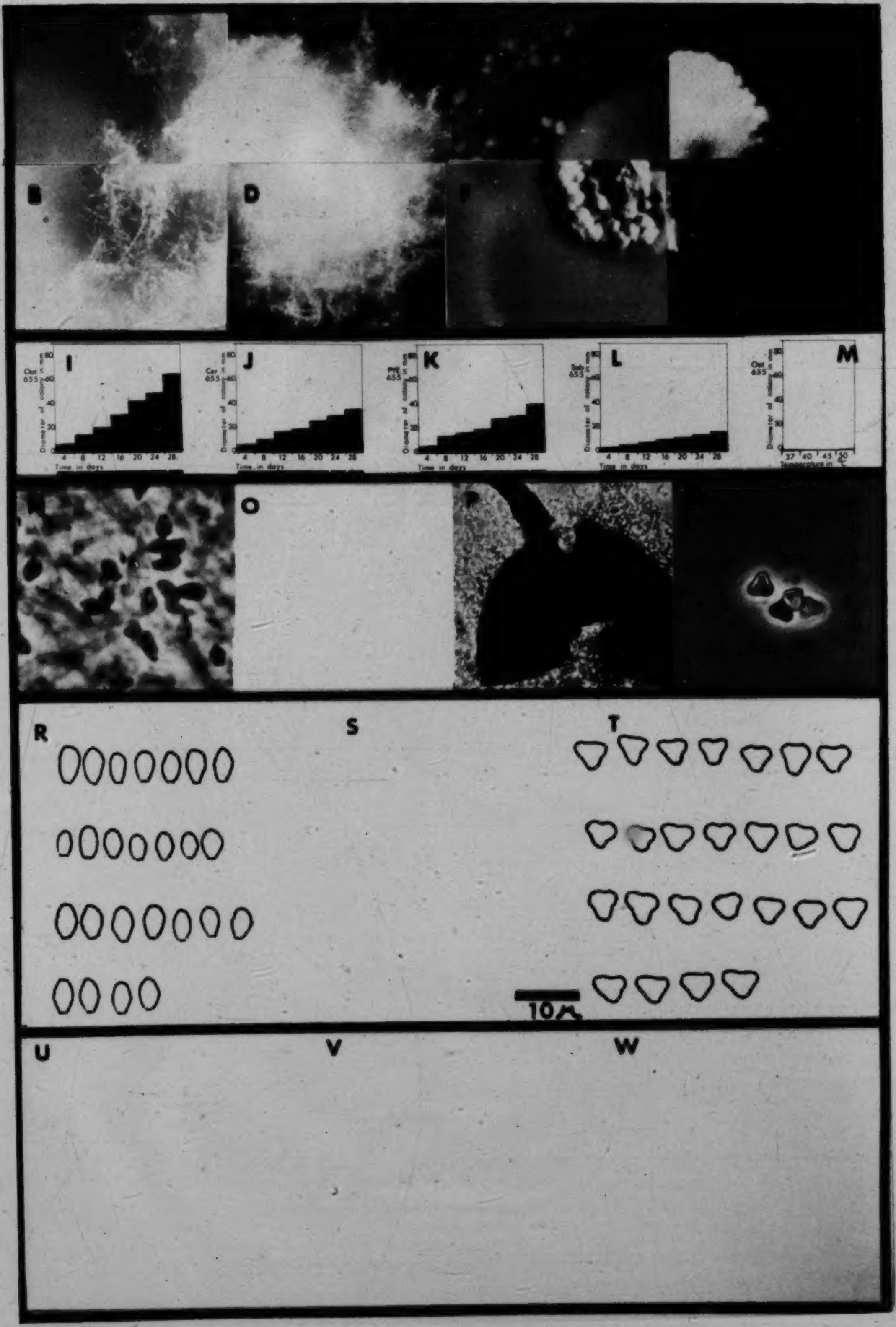

B
D
F
I
J
K
L
M
Oat 655
Corn 655
PYE 655
Sab 655
Oat 655
Diameter of colony in mm
0
20
40
60
80
4 8 12 16 20 24 28
Time in days
37 40 45 50
Temperature in °C
O
P
R
S
T
10 μ
U
V
W

Plate #58: *Kernia nitida* UAMH 3060

Isolated 1954 by R. K. Benjamin

Received 1969 from Benjamin as *Kernia brachytricha*

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Cream/light
        - 2) Cer- Mod. grey/none
        - 3) PYE- Lt. cream green/gold
        - 4) Sab- Lt. grey/gold green
2. **Growth Rates**
    - a. at 25°C on different media Figs. I-L
    - b. at different temperatures on Oat Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- not seen Figs. N,R
    - b. Synnematous conidia- not seen Figs. O,S
    - c. Ascocarps- 86-118.5 µm dia. Figs. P,U
    - d. Ascospores- 4-5 x 2-3 µm,golden Figs. Q,T,V,W
4. **Comments**

Malloch (1971) reclassified the species *K. brachytricha* to be a synonym of *K. nitida*.

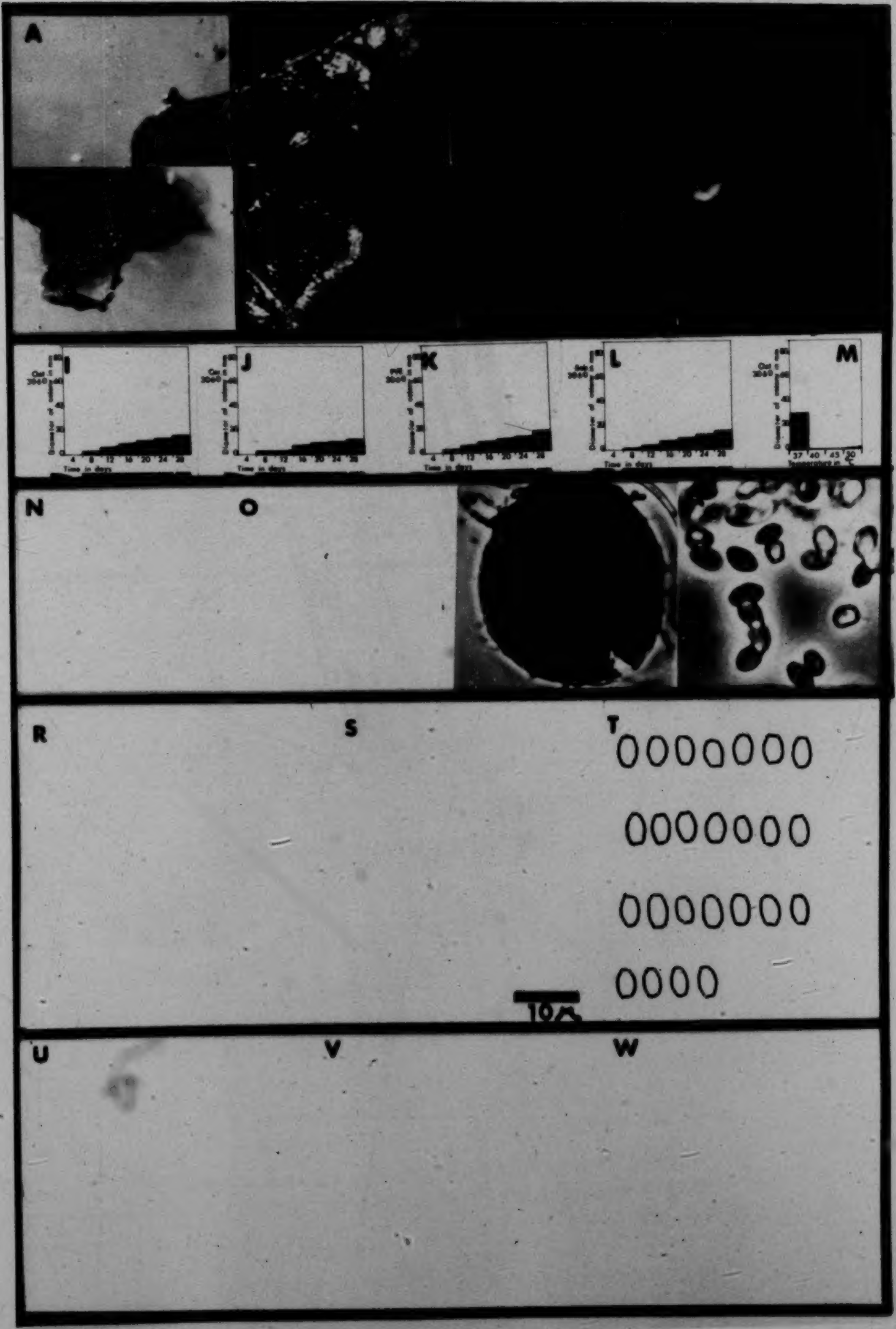

A
I
J
K
L
M
3060
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
O
R
S
T
U
V
W
10µ

Plate #59: *Lophotrichus ampullus* UAMH 1762

Isolated from dung, 1949 by Anastasiou

Received 1963 from Anastasiou as *Lophotrichus ampullus* Benj. 779

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Dark grey/mod.dark
        - 2) Cer- Dark mouse brown/none
        - 3) PYE- Mod. grey/dark olive green
        - 4) Sab- Dark olive green/dark olive green
2. **Growth Rates**
    - a. at 25°C on different media Figs. I-L
    - b. at different temperatures on Oat Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- not seen Figs. N,R
    - b. Synnematous conidia-not seen Figs. O,S
    - c. Ascocarps- 170.5-231.5 *u*m dia. Figs. P,U
    - d. Ascospores- 9-12.5 x 6.5-7.5 *u*m,golden Figs. Q,T,V,W
4. **Comments**

Fig. P illustrates the long beak and the hairs on the ascocarp.

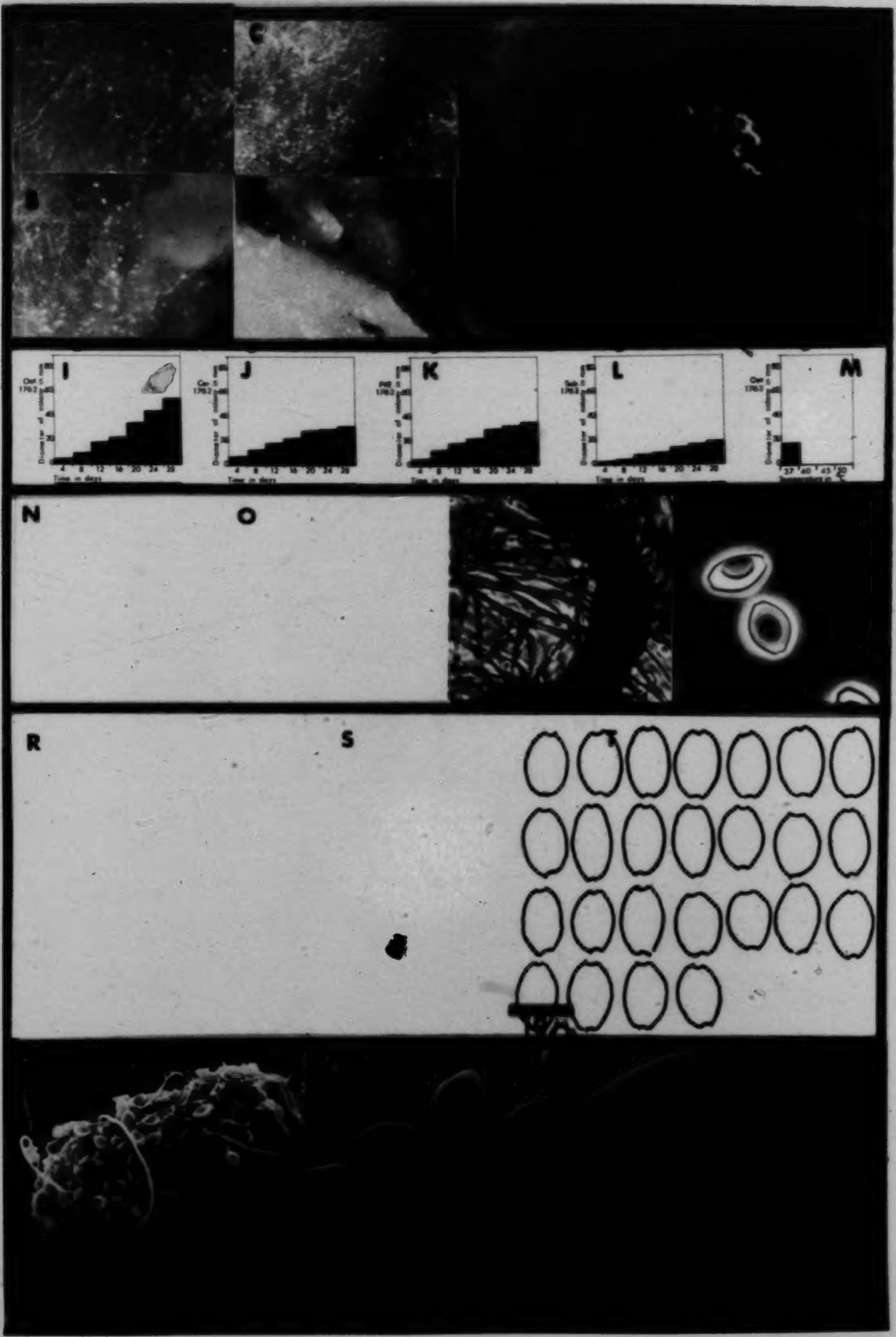

C
B
I
Oat S
1762
Diameter of colony
80
60
40
20
4
8
12
16
20
24
28
Time in days
J
Cer S
1762
K
Pitt S
1762
L
Sab S
1762
M
Oat S
1762
37
40
45
50
Temperature in °C
N
O
R
S
T

Plate #60: *Faurelina elongata* UAMH 4232

Isolated from goat dung by K. G. Mukerji

Received 1979 from CBS as *Faurelina elongata* CBS 126.78

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Dark/lt.
        - 2) Cer- Dark brown/none
        - 3) PYE- Cream lt. gold/tan
        - 4) Sab- Lt. cream green/cream
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 6.5-17.5 x 3.5-6.5 μm — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- measurement not available — Figs. P,U
    - d. Ascospores- 4.5-7 x 2.5-4.5 μm,golden — Figs. Q,T,V,W
4. **Comments**

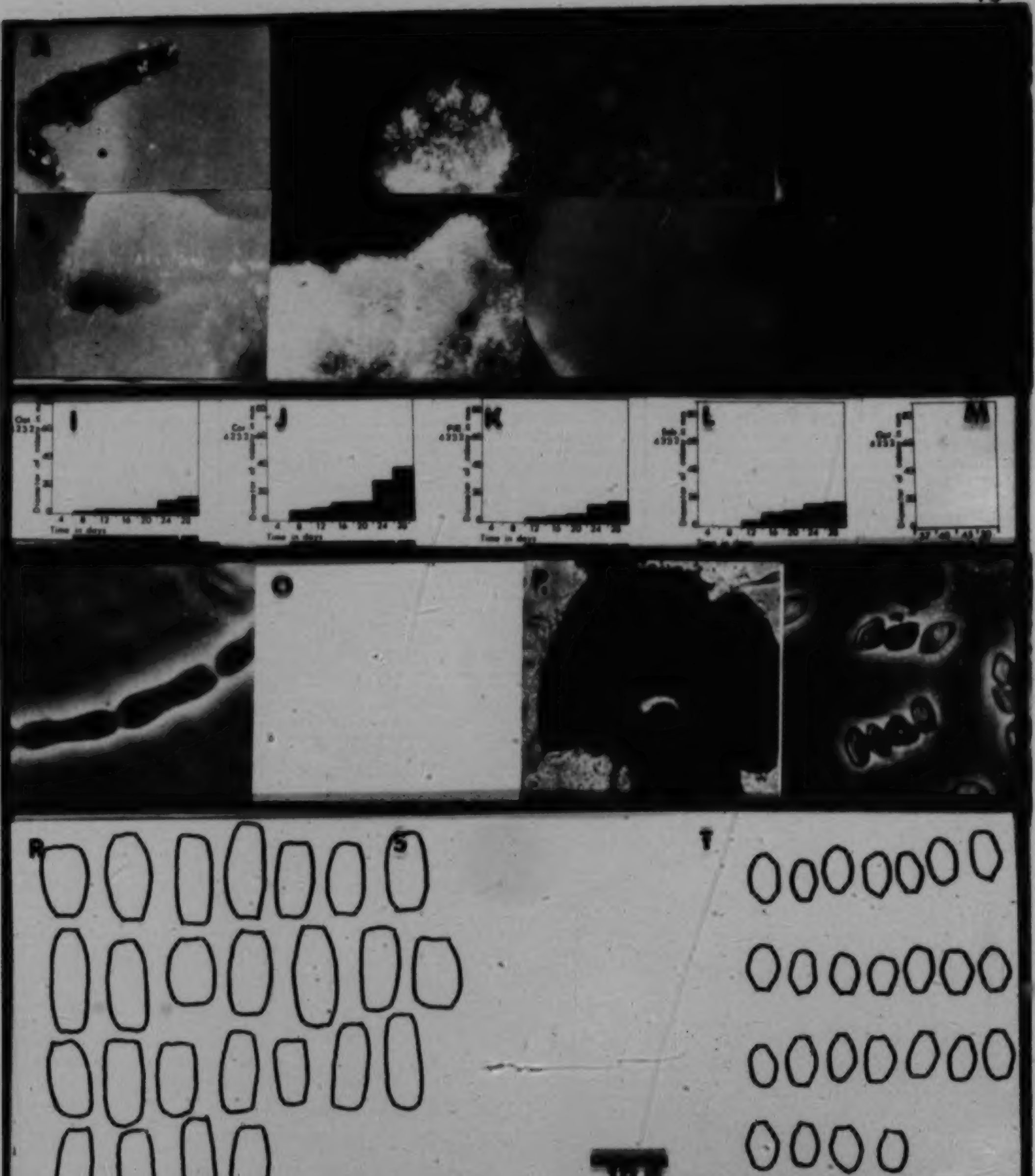

A
I
J
K
L
M
Time in days
4 8 12 16 20 24 28
O
R
S
T
U
V
W

Plate #61: *Pithoascus langeronii* UAMH 4234

Isolated as a contaminant in *Petriellidium fimeti* culture, Netherlands, 1978 by von Arx

Received 1979 from CBS as *Pithoascus langeronii* CBS 203.78

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        1) Oat- White/light
        2) Cer- Cream tan/none
        3) PYE- White/cream yellow
        4) Sab- Pale cream yellow/yellow gold
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- 2.5-7.5 x 1-2 um — Figs. N,R
    - b. Chlamydospores- 3-5.5 x 2-3.5 um — Figs. O,S
    - c. Ascocarps- 74.5-91.5 um dia. — Figs. P,U
    - d. Ascospores- measurements not available Figs. Q,T,V,W
4. **Comments**

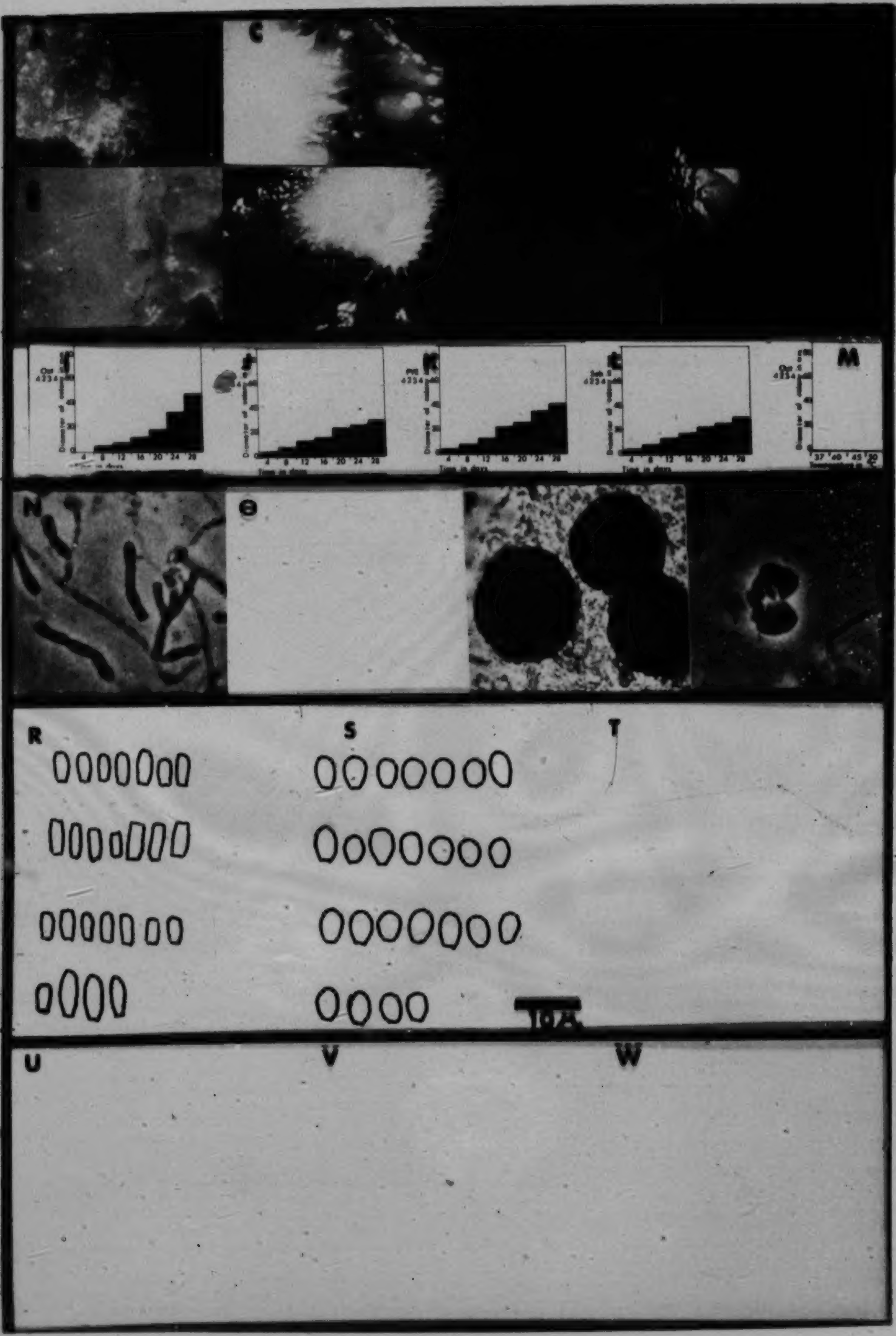

C
M
N
O
R
S
T
U
V
W
10µ
Time in days
4 8 12 16 20 24 28
37 40 45 50
0 20 40 60

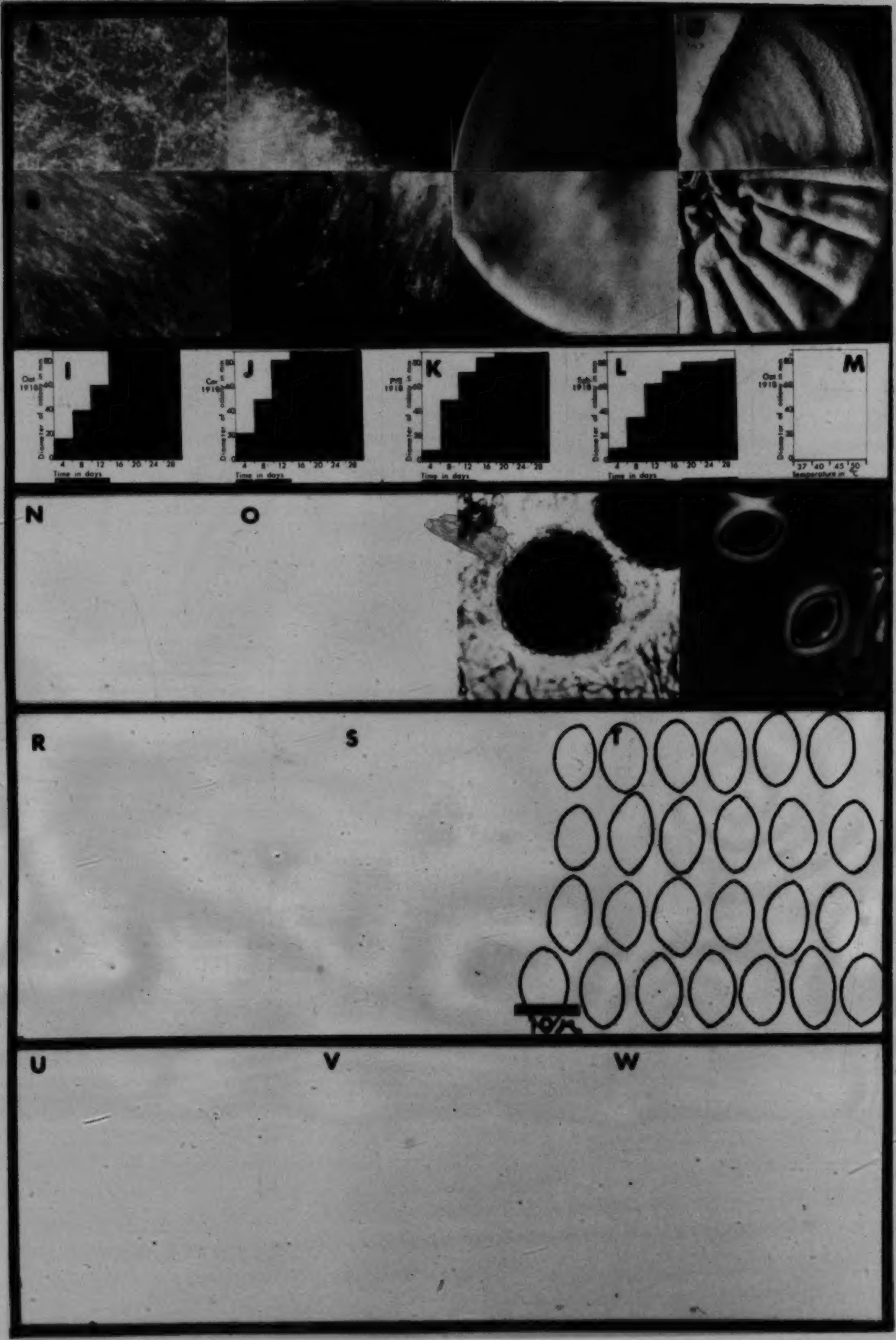
Plate #62: *Thielavia terricola* UAMH 1918

Isolated from soil, Japan, 1958 by Udagawa

Received 1964 from Emmons as *Thielavia terricola*

NHL 2269

1. **Colonies**
    - a. 4 days on Oat Cer PYE and Sab — Figs. A-D
    - b. 21 days on Oat Cer PYE and Sab — Figs. E-H
    - c. Colour at 28 days (Surface/Reverse)
        - 1) Oat- Off white/light
        - 2) Cer- Off white/none
        - 3) PYE- White/yellow
        - 4) Sab- Off white/gold
2. **Growth Rates**
    - a. at 25°C on different media — Figs. I-L
    - b. at different temperatures on Oat — Fig. M
3. **Microscopic Characters**
    - a. Diffuse conidia- not seen — Figs. N,R
    - b. Synnematous conidia- not seen — Figs. O,S
    - c. Ascocarps- 70-128 um dia. — Figs. P,U
    - d. Ascospores- 10-14.5 x 7-8.5 um,brown — Figs. Q,T,V,W
4. **Comments**


I
J
K
L
M
Oat 1918
Cor 1918
Pig 1918
Sab 1918
Oat 1918
Diameter of colony in mm
0
20
40
60
80
4
8
12
16
20
24
28
Time in days
37
40
45
50
Temperature in °C
N
O
P
R
S
T
10µ
U
V
W

The illustrations were compiled in this format for convenience. Comparison of the strains of *P. boydii*, comparison of *P. boydii* to other species of *Petriellidium* and species of the other genera included in the Microascaceae and Pithoascaceae could be easily made.

G. Results of TAXMAP analyses

The first analysis, using all attributes for all 67 strains yielded inconclusive results due to the numerous cases where attribute values could not be scored because the structures were missing. For example, ascospore and ascocarp characters could not be scored for 31 strains which did not produce ascomata. Therefore the attributes were split into three groups: 1) vegetative growth attributes which were applicable to all strains, 2) conidial attributes which were applicable to most strains and 3) ascospore attributes which were applicable to about half of the strains. Then the relations among the strains were analysed in four separate groups: 1), all of the strains were compared on their vegetative and conidial attributes; 2), the *Petriellidium* strains alone were compared on their vegetative and conidial attributes; 3), all ascospore-producing strains were compared on their vegetative and ascospore attributes; 4), the *Petriellidium* ascospore-producing strains were compared on their vegetative and ascospore attributes. The only available strain of *P. africanum* (UAMH 4000) was included in the third and fourth analysis, even though it has not produced ascospores since it was received at UAMH. For each of the four analyses, two sets of results are presented, the first based on differentially weighted attributes, the second on equally weighted attributes (see page 23). In general, the differentially weighted analyses produced the most useful results, but since there is still no general agreement on weighting, both are presented and compared.

The results of each analysis are represented first in the form of a table showing the cluster membership and some statistics pertaining to the clusters and then in the form of a taxometric map (Carmichael and Sneath 1969) illustrating the relationships among the clusters given in the table. The clusters are positioned on the map by triangulation from this and two nearest neighbours. The diameter of the circles in the maps represents the distance between the two most distant OTU's in the cluster. The number of OTU's in the cluster is not represented graphically, but can be seen in the tables. The straight lines represent undistorted distances between clusters, or between isolated OTU's. The points followed by a number represent isolated OTU's which are treated as clusters with no variation and the arrows indicate nearest neighbours (Carmichael and Sneath 1969).

1) Comparison of all strains on conidial and vegetative attributes

a) Results of analysis with differential weighting.

Table 5 and Figure 11

The largest cluster (#2) included 36 of the 38 *P. boydii* strains along with *P. fusoideum*, *P. angustum*, and *P. ellipsoideum*. The other two *P. boydii* strains, UAMH 2324 and UAMH 3749, and the remaining *Petriellidium* species were clustered as isolated points. The isolated *P. boydii* strains clusters 7 and 8 were nearest neighbours to each other and to cluster #2. The reasons these two strains were isolated from the rest of the *P. boydii* strains was UAMH 2324 had a "sickly" appearance and growth and UAMH 3749 had a slow growth rate.

The *Petriella* strains were grouped into two clusters and an isolated strain. The first cluster contained the *Pe. sordida* strains plus *Pe. guttulata* and one of the four *Pe. setifera* strains. The second cluster included two *Pe. setifera* strains and *Pe. lindforsii*. The isolated cluster was a *Pe. setifera* strain.

The *Microascus* strains were mostly separated into isolated points. None clustered with another member of *Microascus*. *M. desmosporus* (wood isolate) was grouped with *Lophotrichus*. *M. longirostris* was grouped with *Thielavia* and *M. intermedius* with *Kernia* probably due to the lack of a conidial state.

The *Pithoascaceae* strains *Faurelina* and *Pithoascus* were clustered as isolated points.

It is noteworthy that in this analysis based on vegetative and conidial characters, the *Petriellidium* strains were nearest neighbours to each other except for *P. fimeti* and *P. africanum*.

Table 5
1)Comparison of all strains on conidial and vegetative attributes. a) Results of analysis with differential weighting.

```
MAP CLUSTER ANALYSIS: ALL SPECIES CONIDIAL CHARACTERS

(MINIMUM NUCLEUS 0.128, MAXIMUM DROP 0.0437 BOTH ARE 100% OF NORMAL)

CLUS OTU DIST OTU  AVGOF  DROP FAR DIST FLAG NAME OF OTU
TER  NOS BEST BEST  NEW    IN  OTU FAR
NO.      LINK LINK LINKS  AVE.     OTU
----------------------------------------------------------
  1   55                                     TBA4305S
      57 0.0                                 TTE1915S
      59 0.04   57 0.047 0.047  55 0.05      MLC0405P

      46 0.10   55 0.180 0.112  56 0.21 1000 PLI3998U
----------------------------------------------------------
  2   28                                     PB04238P
      29 0.0                                 PB04246P
      19 0.11   28 0.105 0.105  28 0.11      PB02904P
       4 0.03   19 0.083-0.022  28 0.11      PB01098P
       3 0.03    4 0.084 0.001  28 0.13      PB00600N
      31 0.04    3 0.098 0.014  28 0.15      PB04302P
      35 0.05    4 0.094-0.003  28 0.15      PB03873P
      10 0.03   35 0.106 0.011  28 0.15      PB02507N
      13 0.02   10 0.093-0.012  28 0.17      PB02239N
       5 0.03   13 0.109 0.015  28 0.20      PB01101S
      44 0.05   19 0.107-0.001   5 0.15      PFU3997N
      30 0.05   31 0.112 0.004  28 0.20      PB04301P
      12 0.05   44 0.110-0.001   5 0.16      PB03230N
      26 0.05   35 0.098-0.012  28 0.15      PB02981S
      22 0.03   26 0.095-0.004  26 0.17      PB02982P
       2 0.05   13 0.128 0.033  28 0.21      PB00153N
      23 0.04    2 0.124-0.004  28 0.20      PB02850A
       1 0.05    2 0.122-0.002  26 0.23      PB00002P
       6 0.02    1 0.125 0.003  28 0.23      PB01265P
      17 0.05    1 0.126 0.001  28 0.21      PB03877N
       7 0.02   17 0.131 0.005  28 0.23      PB01855N
      34 0.05   44 0.123-0.008   5 0.16      PB04310P
      27 0.03   34 0.111-0.012  28 0.17      PB04218P
       9 0.04   27 0.102-0.008  28 0.16      PB02217P
      32 0.03    6 0.104 0.002  28 0.17      PB04303P
      14 0.04   27 0.130 0.026  28 0.20      PB03746N
      33 0.04   14 0.127-0.003  28 0.22      PB04304P
      15 0.05   34 0.110-0.016   5 0.17      PB03873N
      16 0.05    2 0.144 0.033  28 0.25      PB03750N
      36 0.05    6 0.124-0.020  28 0.24      PB03992S
      38 0.06   34 0.113-0.011  28 0.21      PB0521FS
      25 0.07   34 0.148 0.035  28 0.22      PB03995S
      40 0.01   25 0.153 0.005  28 0.24      PAN3984N
      21 0.07   15 0.151-0.002  16 0.23      PB03581P
      37 0.07   36 0.165 0.014  28 0.29      PB05220N
      24 0.06   37 0.153-0.012  40 0.22      PB0522LD
      20 0.06   18 0.170 0.017  40 0.26      PB03905P
      11 0.10   20 0.159-0.011  37 0.22      PB03875P
      42 0.04   11 0.151-0.008   9 0.22      PEL3987S

      41 0.11   40 0.245 0.095  20 0.39 1000 PDE3993S
----------------------------------------------------------
  3   53                                     PS03983U
      54 0.02                                PS03985S
      52 0.18   54 0.098 0.082  53 0.18      PS01610U
      49 0.11   54 0.116 0.018  53 0.12      PCU3996N
      45 0.08   45 0.146 0.026  53 0.17      PSE680VU

      55 0.10   45 0.227 0.083  52 0.20 1004 TBA4305S
----------------------------------------------------------
  4   48                                     PSE1862C
      50 0.03                                PSE1924S
      46 0.10   50 0.114 0.082  48 0.13      PLI3889U

      55 0.10   48 0.155 0.041  48 0.16    4 TBA4305S
       LINK TO CLUSTER  -1
----------------------------------------------------------
  5   57                                     MIN2469P
      63 0.05                                KBR3060U

      60 0.12   57 0.148 0.100  63 0.17 1000 MS12637U
----------------------------------------------------------
  6   66                                     MS38WIDE
      64 0.03                                LAM1782U

      61 0.12   66 0.206 0.118  64 0.28 1200 MTRC655U
----------------------------------------------------------

ISOLATED OTU'S (SINGLE MEMBER CLUSTERS)

CLUSTER OTU LABEL
      7   8 PB02226P
      8  18 PB03746N
      9  39 PAF4000S
     10  41 PDE3993S
     11  43 PF14257N
     12  47 PMU3880W
     13  51 PSE2702S
     14  56 MDE0955U
     15  58 MMA2642M
     16  60 MS12637U
     17  61 MTRC655U
     18  62 FEL4232M
     19  65 PLA4234C
```

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Fig. 11
Taxometric map for comparison of all strains on conidial and vegetative attributes, differential weighting.

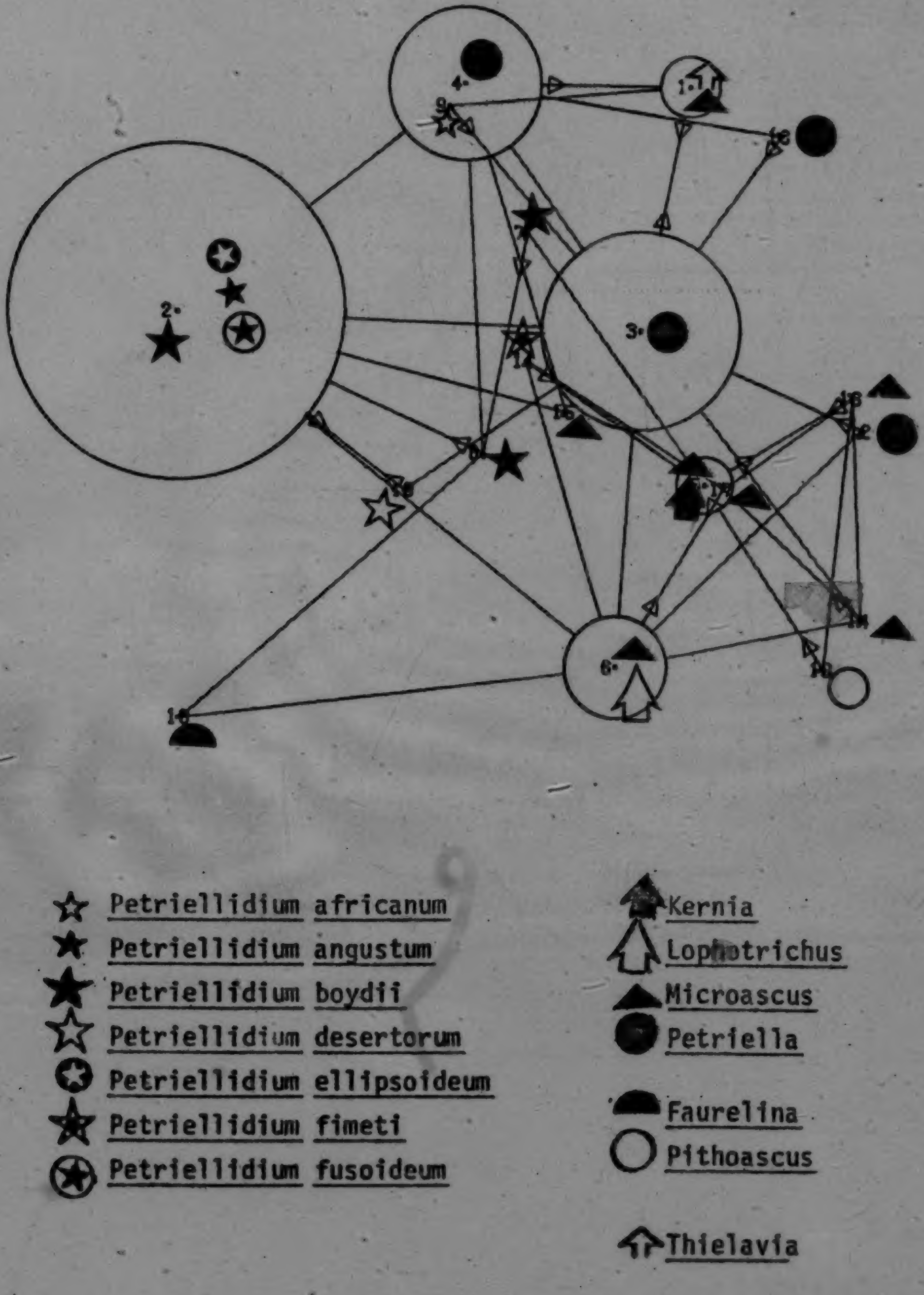
4
9
2
3
6
Petriellidium africanum
Petriellidium angustum
Petriellidium boydii
Petriellidium desertorum
Petriellidium ellipsoideum
Petriellidium fimeti
Petriellidium fusoideum
Kernia
Lophotrichus
Microascus
Petriella
Faurelina
Pithoascus
Thielavia

Table 6

1)Comparison of all strains on conidial and vegetative attributes. b) Results of analysis with equal weighting.

```
MAP CLUSTER ANALYSIS:-ALL SPECIES CONIDIAL CHARACTERS

(MINIMUM NUCLEUS 0.168, MAXIMUM DROP 0.0484 BOTH ARE 100% OF NORMAL)
EQUALLY WEIGHTED ATTRIBUTES


CLUS OTU DIST OTU  AVGOF  DROP FAR DIST FLAG NAME OF OTU
TER  NOS BEST BEST  NEW    IN  OTU FAR
NO.      LINK LINK LINKS  AVG.      OTU
-----------------------------------------------------------
  1   65                                   TBA43055
      67 0.0                               TTE18185
      56 0.02   67 0.021-0.021  65 0.02    ML00406P
      57 0.08   56 0.095 0.075  65 0.11    MIN2488P
      63 0.04   57 0.101 0.008  57 0.12    KBR3080U

      60 0.15   57 0.188 0.087  65 0.23 1000 MS12837B
-----------------------------------------------------------
  2   28                                   PB04223BP
      29 0.0                               PB04248P
       4 0.13   29 0.128 0.128  28 0.13    PB01089P
       3 0.03    4 0.106-0.022  28 0.15    PB00800N
      19 0.03    4 0.083-0.023  28 0.13    PB03904P
      21 0.04    3 0.101 0.018  29 0.17    PB04302P
      44 0.08   19 0.101 0.000  28 0.17    PFU3997M
      12 0.08   44 0.094-0.007  28 0.18    PB03230M
      31 0.08   19 0.120 0.026  28 0.18    PB03881P
      35 0.08    4 0.137 0.017  29 0.20    PB03872P
      10 0.03   35 0.145 0.008  28 0.23    PB02507N
      13 0.03   10 0.133-0.012  28 0.23    PB03239M
       5 0.03   13 0.146 0.013  28 0.25    PB01101B
      34 0.08   35 0.135-0.010  28 0.21    PB03891S
      22 0.03   34 0.128-0.007  28 0.21    PB03862P
      30 0.08   34 0.140 0.012  28 0.25    PB04301P
      38 0.07   30 0.172 0.032  29 0.29    PB03985S
      40 0.01   38 0.172-0.000  28 0.30    PAN3984K
       2 0.09   13 0.198 0.026  28 0.29    PB00153N
      16 0.03    2 0.201 0.005  29 0.30    PB03750M
      23 0.04    2 0.184-0.018  28 0.29    PB03990A
      26 0.07   23 0.180-0.004  28 0.30    PB0521FS
      27 0.07   26 0.221 0.041  28 0.37    PB05220M
      38 0.06   37 0.197-0.023  28 0.38    PB0522LD
       1 0.08    2 0.177-0.020  29 0.30    PB00007P
       6 0.03    1 0.175-0.002  28 0.30    PB01285P
      17 0.04    1 0.171-0.004  28 0.29    PB03872M
       7 0.03   17 0.174 0.003  28 0.31    PB01666N
      25 0.06    6 0.170-0.004  29 0.33    PB03882S
      42 0.09   25 0.188 0.018   5 0.27    PEL39879
      11 0.08   42 0.188 0.000  44 0.28    PB03876P

      14 0.09   28 0.168-0.020   5 0.28   30 PB03748M
-----------------------------------------------------------
  3   53                                   PB03983U
      54 0.02                              PB03885S
      52 0.10   54 0.107 0.088  53 0.11    PB01410U
      45 0.08   52 0.124 0.018  53 0.15    PEU3898M
      46 0.11   45 0.164 0.040  53 0.21    PL13898U
      48 0.13   45 0.170 0.006  53 0.22    PSE0805U
      51 0.13   54 0.202 0.032  46 0.30    PSE2703S
      50 0.16   48 0.195-0.007  52 0.24    PSE1924S
      49 0.03   50 0.175-0.013  48 0.24    PSE1862C

      47 0.18   53 0.270 0.094  51 0.36 1200 PHU3888W
-----------------------------------------------------------
  4    8                                   PB02217P
      32 0.03                              PB04303P
      27 0.03    8 0.046 0.023  32 0.08    PB04218P
      14 0.03   27 0.047 0.002  32 0.08    PB03748M
      36 0.03   27 0.080-0.007   8 0.08    PB04310P
      33 0.03   32 0.051 0.011  27 0.08    PB04204P
      18 0.08   32 0.066 0.015  33 0.08    PB03873M
      20 0.07   18 0.127 0.061  33 0.16    PB03905P

      26 0.09   14 0.123-0.004  20 0.20    4 PB0521FS
       LINK TO CLUSTER  -2
-----------------------------------------------------------
  5   60                                   MS12837B
      61 0.11                              MTR0655U
      58 0.13   61 0.148 0.037  60 0.17    MDE0655U

      57 0.15   60 0.242 0.093  58 0.34 1004 MIN2488P
-----------------------------------------------------------
  6   66                                   MS30WIDE
      64 0.13                              LAM1702U

      61 0.15   66 0.250 0.117  64 0.35 1006 MTR0655U
-----------------------------------------------------------

ISOLATED OTU'S (SINGLE MEMBER CLUSTERS)

CLUSTER OTU LABEL
      7   9 PB02324P
      8  15 PB03749M
      9  39 PAF4000S
     10  41 PBE3803S
     11  43 PF14267M
     12  47 PHU3888W
     13  55 MMA2842M
     14  62 PEL4232M
     15  65 PLA4234C
```

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Fig. 12
Taxometric map for comparison of all strains on conidial and vegetative attributes, equal weighting.

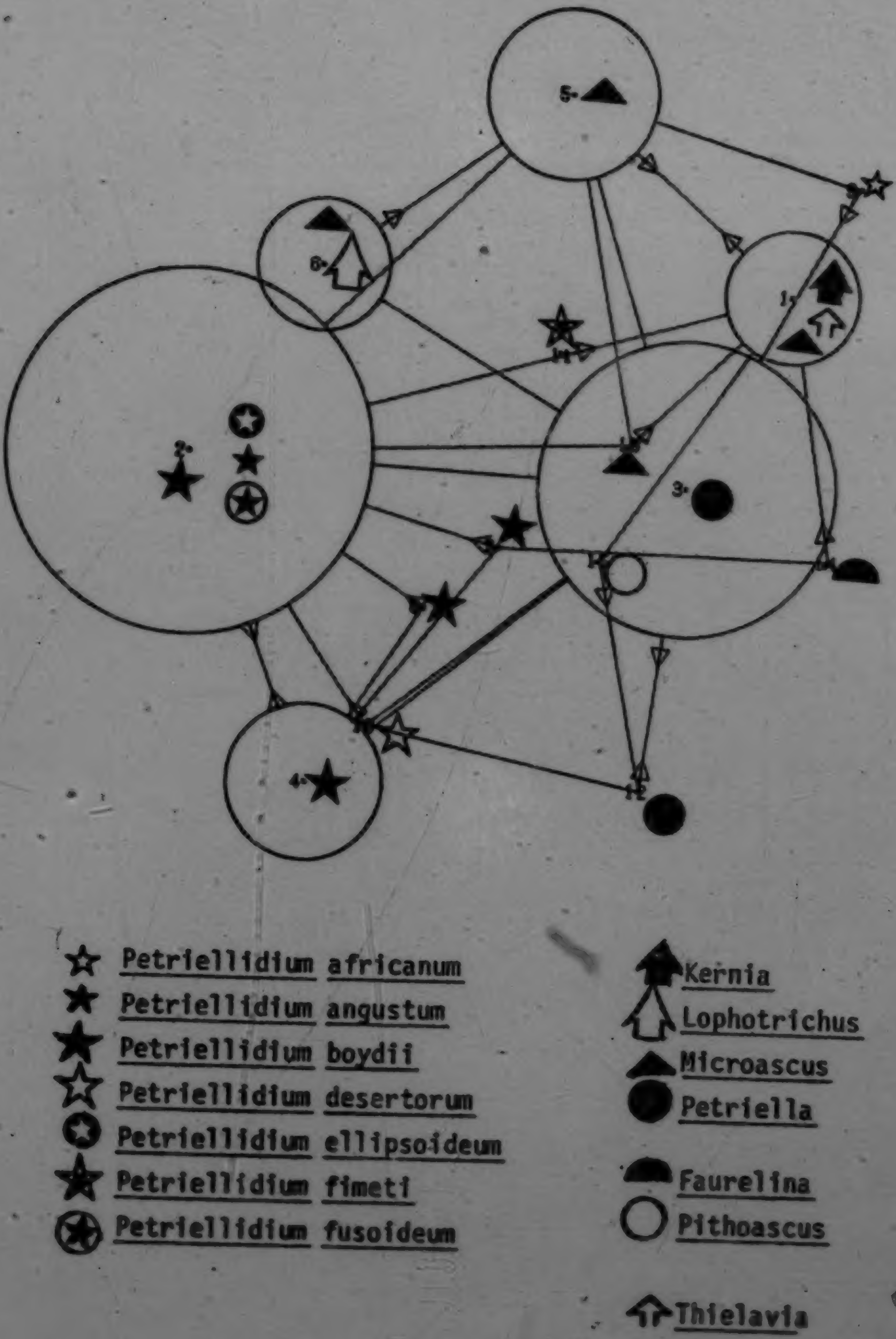
5
6
1
2
3
4
Petriellidium africanum
Petriellidium angustum
Petriellidium boydii
Petriellidium desertorum
Petriellidium ellipsoideum
Petriellidium fimeti
Petriellidium fusoideum
Kernia
Lophotrichus
Microascus
Petriella
Faurelina
Pithoascus
Thielavia

Table 7
2) Comparison of *Petriellidium* strains on conidial and vegetative attributes. a) Results of analysis with differential weighting.

```
 MAP CLUSTER ANALYSIS: PET SPECIES CONIDIAL CHARACTER.

 (MINIMUM NUCLEUS 0.112, MAXIMUM GROP 0.0334 BOTH ARE 100% OF NORMAL)

 CLUS OTU DIST OTU  AVCOF  GROP FAR DIST FLAG NAME OF OTU
 TER  NOS BEST BEST  NEW    IN  OTU FAR
 NO.      LINK LINK LINKS  AVG.     OTU
 ----------------------------------------------------------------
   1   28                                      PB04238P
       29 0.0                                  PB04246P

       19 0.12   29 0.123 0.123  28 0.12 1200 PB03904P
 ----------------------------------------------------------------
   2   26                                      PB03985S
       40 0.01                                 PAN3984N
       25 0.08   26 0.088 0.073  40 0.08      PB03992S

        6 0.08   26 0.141 0.052  40 0.18 1000 PB01285P
 ----------------------------------------------------------------
   3    8                                      PB02217P
       32 0.03                                 PB04303P
       27 0.05    8 0.060 0.034  32 0.07      PB04216P
       34 0.04   27 0.054-0.007   8 0.07      PB04310P
       14 0.05   27 0.074 0.020  32 0.10      PB03742M
       33 0.08   14 0.077 0.002  27 0.11      PB04304P

       44 0.07   34 0.115 0.038  33 0.15 1000 PFU3987M
 ----------------------------------------------------------------
   4    1                                      PB00002P
        6 0.03                                 PB01285P
        2 0.06    1 0.071 0.043   6 0.06      PB00153N
       23 0.05    2 0.087 0.027   6 0.13      PB03990A
       13 0.08    2 0.100 0.003   6 0.17      PB03239M
       10 0.03   13 0.094-0.007   6 0.13      PB02507N
        5 0.04   13 0.098 0.002   6 0.15      PB01101B
       35 0.04   10 0.088-0.006   6 0.14      PB03973P
        4 0.06   35 0.114 0.028   6 0.15      PB01098P
        3 0.03    4 0.118 0.004   2 0.18      PB00800N
       19 0.04    4 0.117-0.001   6 0.18      PB03904P
       31 0.08    3 0.118 0.001  23 0.19      PB04302P
       24 0.08   35 0.107-0.011   2 0.16      PB03931S
       22 0.04   24 0.098-0.006   2 0.14      PB03982P
       30 0.08   31 0.115 0.017  23 0.18      PB04301P

       44 0.07   19 0.152 0.037   1 0.22 1000 PFU3987M
 ----------------------------------------------------------------
   5    7                                      PB01885N
       17 0.03                                 PB03872M

        1 0.07   17 0.072 0.042   7 0.07    4 PB00002P
        LINK TO CLUSTER  -4
 ----------------------------------------------------------------
   6   11                                      PB02875P
       42 0.08                                 PEL3887S

       20 0.12   11 0.141 0.083  42 0.18 1200 PB03905P
 ----------------------------------------------------------------
   7   12                                      PB03230M
       44 0.07                                 PFU3987M
NEEDED .CT. FOUND FOR NEXT OTU **

       19 0.08   12 0.342 0.273  39 0.80 1004 PB03904P
 ----------------------------------------------------------------
   8   37                                      PB05220M
       38 0.08                                 PB0522LD
       36 0.09   37 0.087 0.017  38 0.10      PB0521FS

       25 0.08   38 0.132 0.035  38 0.18 1004 PB03992S
 ----------------------------------------------------------------
   9   18                                      PB03873M
       20 0.08                                 PB03905P

       12 0.10   18 0.131 0.037  20 0.17 1004 PB03230M
 ----------------------------------------------------------------

 ISOLATED OTU'S (SINGLE MEMBER CLUSTERS)

 CLUSTER OTU LABEL
      10   9 PB02324P
      11  15 PB03749M
      12  16 PB03750M
      13  21 PB03881P
      14  39 PAF4000S
      15  41 PBE3953S
      16  43 PF14257M
```

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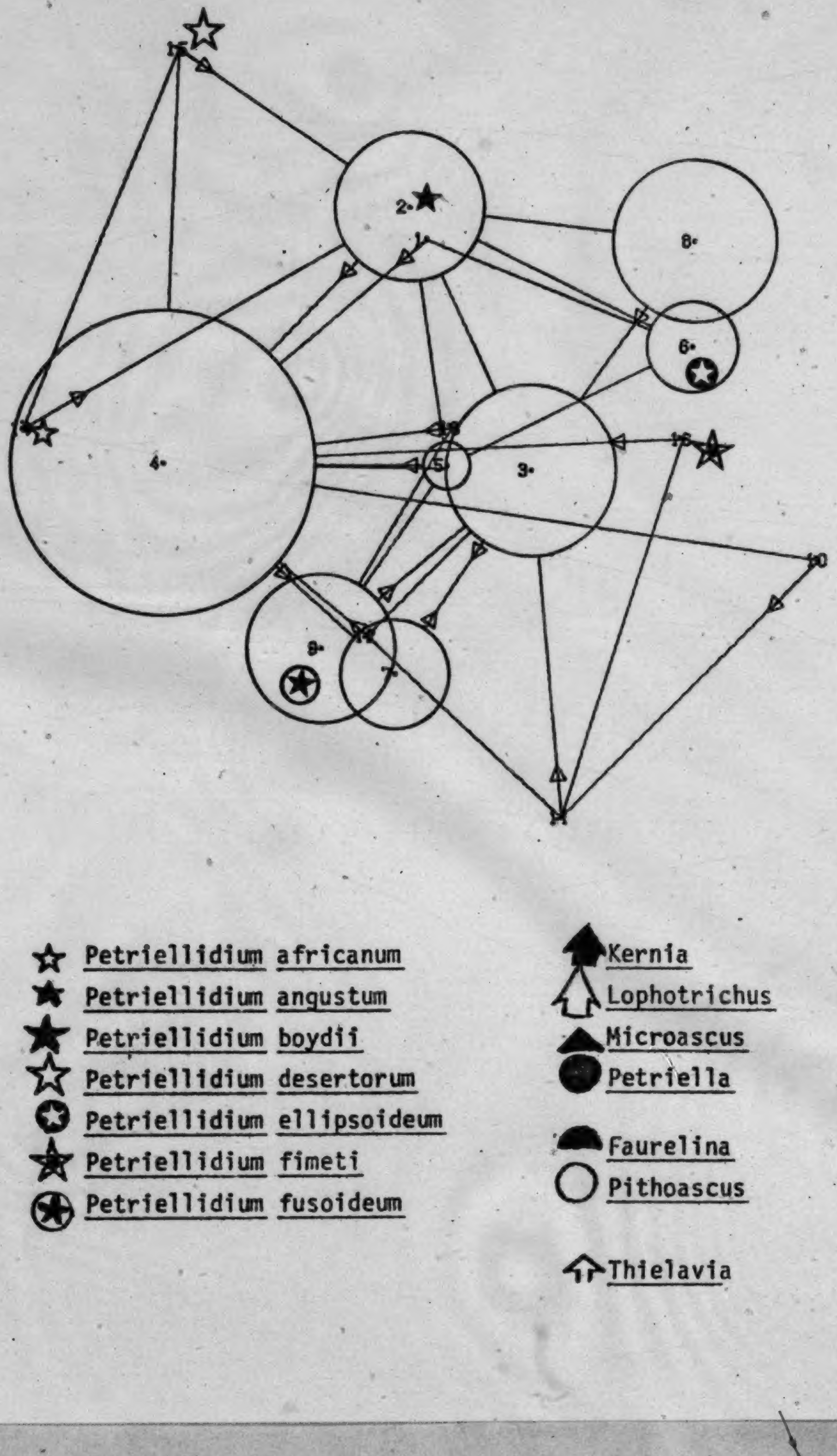
Fig. 13
Taxometric map for comparison of *Petriellidium* strains on conidial and vegetative attributes, differential weighting.



2
1
8
6
4
3
5
16
10
9
7
☆ Petriellidium africanum
★ Petriellidium angustum
★ Petriellidium boydii
☆ Petriellidium desertorum
Petriellidium ellipsoideum
Petriellidium fimeti
Petriellidium fusoideum
Kernia
Lophotrichus
Microascus
● Petriella
Faurelina
○ Pithoascus
Thielavia

Table 8

2) Comparison of *Petriellidium* strains on conidial and vegetative attributes. b) Results of analysis with equal weighting.

```
MAP CLUSTER ANALYSIS:-PET SPECIES CONIDIAL CHARACTERS

(MINIMUM NUCLEUS 0.128, MAXIMUM DROP 0.0372 BOTH ARE 100% OF NORMAL)
EQUALLY WEIGHTED ATTRIBUTES

CLUS OTU DIST OTU  AVGOF  DROP FAR DIST FLAG NAME OF OTU
TER  NOS BEST BEST  NEW    IN  OTU FAR
NO.      LINK LINK LINKS  AVG.     OTU
---------------------------------------------------------------
  1   28                                        PB04238P
      29 0.0                                    PB04248P

       4 0.14   29 0.138 0.138  28 0.14 1200 PB01089P
---------------------------------------------------------------
  2   26                                        PB03985S
      40 0.03                                   PAN3984K
      30 0.10   26 0.108 0.090  40 0.12         PB04301P
      24 0.08   30 0.112 0.003  40 0.14         PB03991S
      22 0.08   24 0.130 0.018  40 0.19         PB03982P
      35 0.09   24 0.156 0.025  40 0.22         PB03873P
      10 0.04   35 0.145-0.010  40 0.23         PB02507N
      13 0.04   10 0.147 0.002  40 0.27         PB03239M
       6 0.05   13 0.170 0.023  40 0.32         PB01101S
       4 0.08   35 0.146-0.023  40 0.24         PB01089P

       3 0.04    6 0.137-0.010  40 0.21   30 PB00600H
---------------------------------------------------------------
  3    1                                        PB00002P
       5 0.03                                   PB01265P
      17 0.06    1 0.073 0.047   5 0.09         PB03672M
       7 0.03   17 0.055-0.014   5 0.07         PB01655N
       2 0.08    1 0.115 0.080   7 0.14         PBU0153N
      18 0.05    2 0.137 0.021   7 0.19         PB03750M
      23 0.08    2 0.117-0.020   5 0.16         PB03990A

      13 0.08    2 0.165 0.046   7 0.23 1004 PB03239M
---------------------------------------------------------------
  4    8                                        PB02217P
      32 0.03                                   PB04303P
      33 0.04   32 0.046 0.015   8 0.05         PB04306P
      27 0.05    8 0.076 0.032  33 0.10         PB04218P
      14 0.06   27 0.063-0.015  32 0.08         PB03746M
      34 0.06   14 0.059-0.004  33 0.08         PB04310P
      16 0.07   32 0.097 0.036  33 0.11         PB03873M
      36 0.09   14 0.132 0.035  16 0.17         PB0521FS

      37 0.09   36 0.184 0.052  32 0.23 1000 PB05220H
---------------------------------------------------------------
  5    3                                        PB00600H
      31 0.08                                   PB04302P
      19 0.07    3 0.081 0.018  31 0.09         PB03904P
      12 0.08   19 0.081 0.010   3 0.10         PB03230M
      44 0.07   12 0.084-0.007   3 0.10         PFU3957M
** NEEDED .GT. FOUND FOR NEXT OTU **

       4 0.09   31 0.336 0.251  35 0.88 1004 PB01089P
---------------------------------------------------------------
  6   11                                        PB02975P
      42 0.06                                   PEL3967S

      26 0.11   42 0.142 0.084  11 0.18 1000 PB03985S
---------------------------------------------------------------
  7   37                                        PB05220H
      38 0.09                                   PB0522LD
** NEEDED .GT. FOUND FOR NEXT OTU **

      36 0.10   38 0.287 0.298  43 0.83 1004 PB0521FS
---------------------------------------------------------------
  8   15                                        PB03749M
      25 0.12                                   PB03992S

      17 0.12   25 0.150 0.032  15 0.18    4 PB03672M
       LINK TO CLUSTER  -3
---------------------------------------------------------------

ISOLATED OTU'S (SINGLE MEMBER CLUSTERS)

CLUSTER OTU LABEL
      9   9 PB02224P
     10  20 PB03905P
     11  21 PB03941P
     12  39 PAF4000S
     13  41 PDE39936
     14  43 PFI4257M
```

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Fig. 14
Taxometric map for comparison of *Petriellidium* strains on conidial and vegetative attributes,equal weighting.

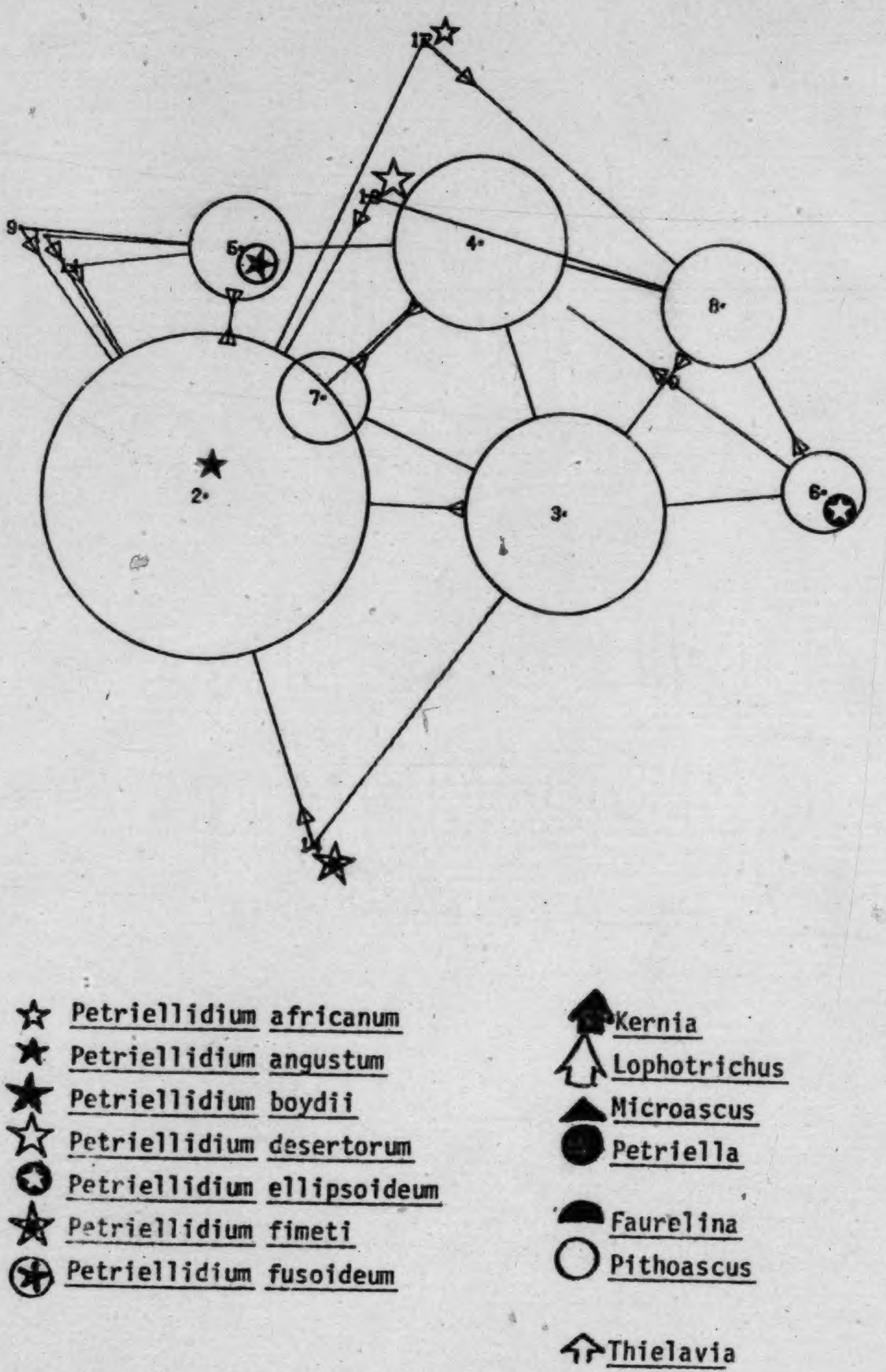
17
10
9
5
4
8
7
2
3
6
1
Petriellidium africanum
Petriellidium angustum
Petriellidium boydii
Petriellidium desertorum
Petriellidium ellipsoideum
Petriellidium fimeti
Petriellidium fusoideum
Kernia
Lophotrichus
Microascus
Petriella
Faurelina
Pithoascus
Thielavia

Table 9
3) Comparison of all strains producing ascospores on ascospore and vegetative attributes. a) Results of analysis with differential weighting.

```
MAP CLUSTER ANALYSIS

(MINIMUM NUCLEUS 0.130, MAXIMUM DROP 0.0438 BOTH ARE 100% OF NORMAL)

CLUS OTU DIST OTU  AVCOF  DROP FAR DIST FLAG NAME OF OTU
TER  NOS BEST BEST  NEW    IN  OTU FAR
NO.      LINK LINK LINKS  AVG.     OTU
.........................................................
  1    6                                        PBO2217P
      12 0.02                                   PBO4303P
      13 0.04    8 0.054 0.031  12 0.07         PBO4304P
       4 0.05    6 0.055 0.011  13 0.08         PBO1265P
       5 0.05    4 0.093 0.028  13 0.12         PBO1886N
       8 0.04    5 0.075-0.018  13 0.11         PBO3872M
       9 0.05    8 0.082 0.007   4 0.11         PBO3873M
       1 0.05    4 0.086 0.004   8 0.12         PBO0002F
      18 0.07    8 0.103 0.017  13 0.15         PEL3987S
      11 0.07   12 0.100-0.003  18 0.13         PBO4302P
       7 0.05   11 0.105 0.005  18 0.14         PBO3239M
       2 0.05    7 0.055-0.010  18 0.12         PBO0193N

      20 0.08   11 0.148 0.052   4 0.18 1000 PFU3897M
.........................................................
  2   22                                        PSE1682C
      23 0.04                                   PSE1924S
      21 0.11   23 0.111 0.071  22 0.11         PLI3998U

      24 0.15   21 0.159 0.048  23 0.18 1200 PSO1410U
.........................................................
  3   10                                        PBO3982S
      16 0.08                                   PAN3984H
      20 0.08   16 0.087 0.031  10 0.10         PFU3897M

      11 0.08   20 0.129 0.042  10 0.18    4 PBO4302P
       LINK TO CLUSTER  -1
.........................................................
  4   35                                        TBA4305S
      36 0.08                                   TTE1918S

      17 0.12   36 0.152 0.071  35 0.18 1000 PDE3893S
.........................................................
  5   26                                        MMA3842M
      30 0.10                                   MTR0855U
      29 0.11   26 0.121 0.019  30 0.13         MSI2637U
      25 0.13   26 0.145 0.026  29 0.17         MS38WIDE
      28 0.14   25 0.182 0.018  28 0.21         MDE0968U

      27 0.17   29 0.225 0.083  28 0.28 1200 MIN2488P
.........................................................

ISOLATED OTU'S (SINGLE MEMBER CLUSTERS)

CLUSTER OTU LABEL
      6   3 PBO1101B
      7  14 PBOS21FS
      8  15 PAF4000S
      9  17 PDE3893S
     10  19 PFI4257M
     11  24 PSO1410U
     12  27 MIN2488P
     13  31 FEL4232M
     14  32 KBR3080U
     15  33 LAM1782U
     16  34 PLA4234C
```

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Fig. 15
Taxometric map for comparison of all strains producing ascospores on ascospore and vegetative attributes, differential weighting.

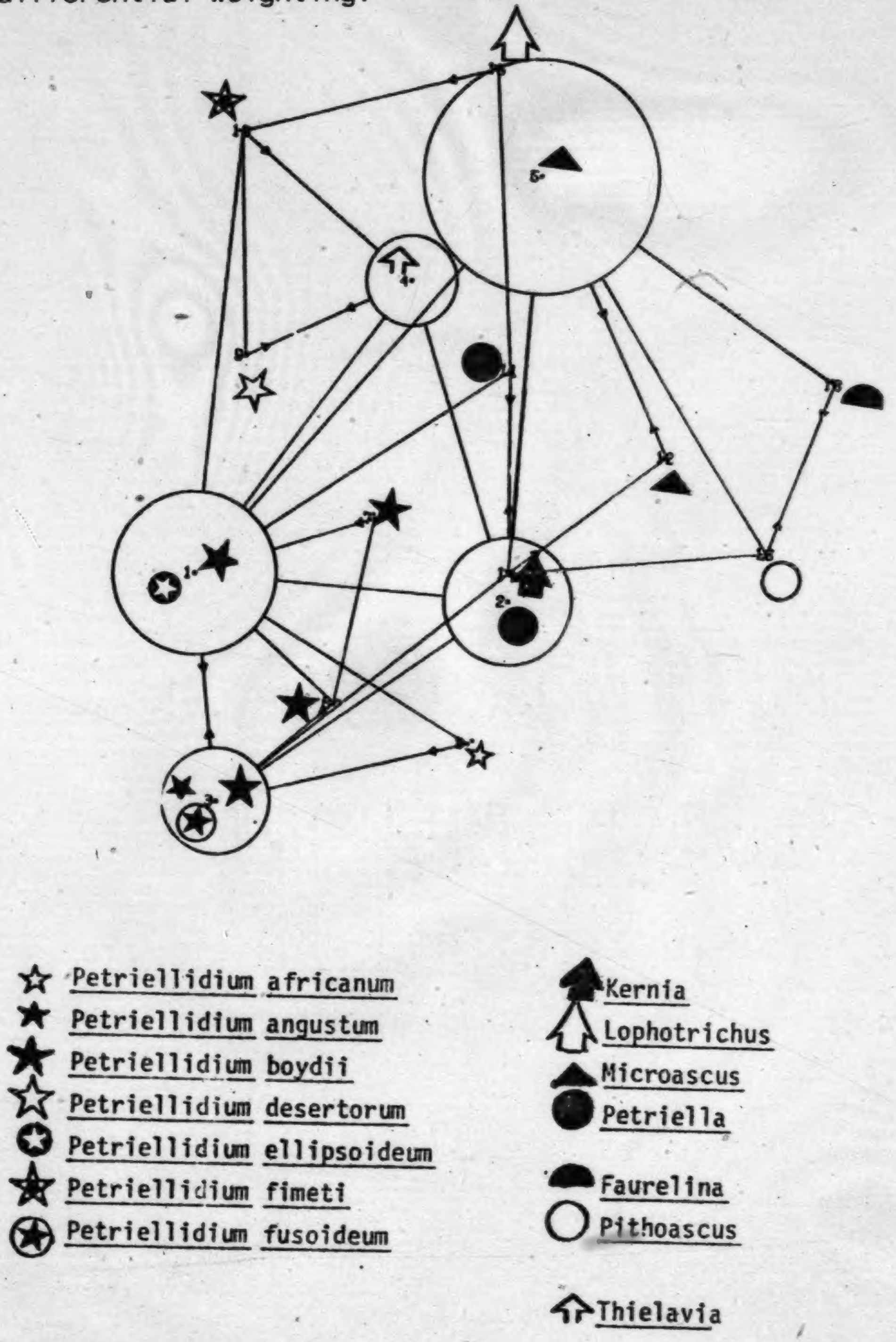
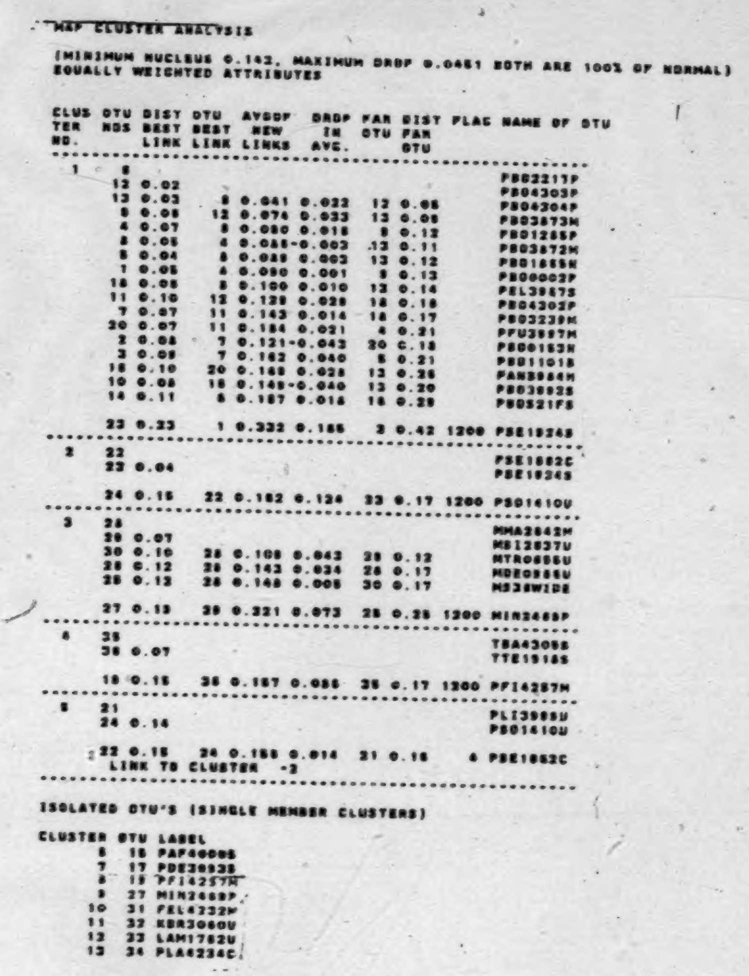

5
4
9
1
2
3
12
16
☆ Petriellidium africanum
★ Petriellidium angustum
★ Petriellidium boydii
☆ Petriellidium desertorum
Petriellidium ellipsoideum
Petriellidium fimeti
Petriellidium fusoideum
Kernia
Lophotrichus
Microascus
Petriella
Faurelina
Pithoascus
Thielavia

Table 10

3) Comparison of all strains producing ascospores on ascospore and vegetative attributes. b) Results of analysis with equal weighting.



```
 MAP CLUSTER ANALYSIS

 (MINIMUM NUCLEUS 0.142, MAXIMUM DROP 0.0451 BOTH ARE 100% OF NORMAL)
 EQUALLY WEIGHTED ATTRIBUTES

 CLUS OTU DIST OTU  AVGDF  DROP FAR DIST FLAG NAME OF OTU
 TER  NOS BEST BEST  NEW    IN  OTU FAR
 NO.      LINK LINK LINKS  AVG.     OTU
 ----------------------------------------------------------------
   1   6                                         PBO2217P
      12 0.02                                    PBO4303P
      13 0.03   6 0.041 0.022  12 0.06           PBO4304P
       9 0.08  12 0.074 0.033  13 0.08           PBO3873M
       4 0.07   9 0.080 0.016   9 0.12           PBO1285P
       8 0.05   4 0.085-0.003  13 0.11           PBO3872M
       5 0.04   8 0.089 0.003  13 0.12           PBO1855N
       1 0.05   4 0.090 0.001   9 0.13           PBO0002P
      16 0.08   5 0.100 0.010  13 0.14           PEL3957S
      11 0.10  12 0.128 0.028  18 0.18           PBO4302P
       7 0.07  11 0.143 0.014  16 0.17           PBO3239K
      20 0.07  11 0.154 0.021   4 0.21           PFU3997M
       2 0.08   7 0.121-0.043  20 0.18           PBO0153N
       3 0.09   7 0.162 0.040   5 0.21           PBO1101S
      18 0.10  20 0.168 0.028  13 0.26           PAN3984M
      10 0.08  18 0.148-0.040  13 0.20           PBO3892S
      14 0.11   6 0.157 0.016  16 0.29           PBO521FS

      23 0.23   1 0.332 0.186   3 0.42 1200 PSE1924S
 ----------------------------------------------------------------
   2  22                                         PSE1882C
      23 0.04                                    PSE1924S

      24 0.15  22 0.182 0.124  23 0.17 1200 PSO1410U
 ----------------------------------------------------------------
   3  26                                         MMA2842M
      29 0.07                                    MBI2837U
      30 0.10  26 0.108 0.043  29 0.12           MTRO655U
      28 0.12  26 0.143 0.034  26 0.17           MDEO555U
      25 0.12  26 0.148 0.005  30 0.17           MS38WIDE

      27 0.13  29 0.221 0.073  25 0.25 1200 MIN2469P
 ----------------------------------------------------------------
   4  35                                         TBA4305S
      36 0.07                                    TTE1518S

      19 0.15  35 0.157 0.085  35 0.17 1200 PFI4257M
 ----------------------------------------------------------------
   5  21                                         PLI3989U
      24 0.14                                    PSO1410U

      22 0.15  24 0.158 0.014  21 0.16    4 PSE1882C
       LINK TO CLUSTER  -2
 ----------------------------------------------------------------

 ISOLATED OTU'S (SINGLE MEMBER CLUSTERS)

 CLUSTER OTU LABEL
       6  15 PAF4600S
       7  17 PDE3893S
       8  19 PFI4257M
       9  27 MIN2469P
      10  31 FEL4232M
      11  32 KBR3060U
      12  33 LAM1782U
      13  34 PLA4234C
```

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Fig. 16
Taxometric map for comparison of all strains producing ascospores on ascospore and vegetative attributes, equal weighting.

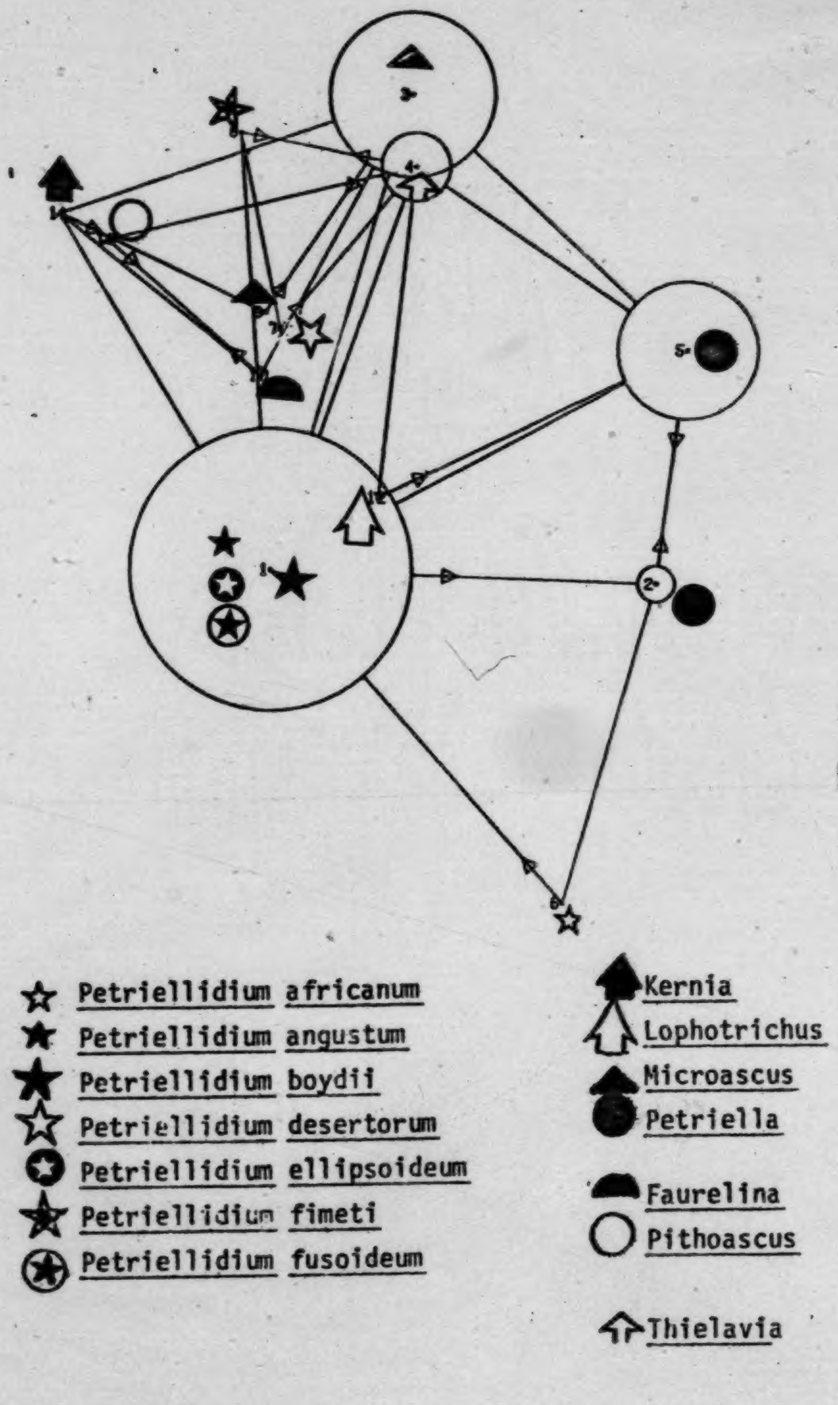
Petriellidium africanum
Petriellidium angustum
Petriellidium boydii
Petriellidium desertorum
Petriellidium ellipsoideum
Petriellidium fimeti
Petriellidium fusoideum
Kernia
Lophotrichus
Microascus
Petriella
Faurelina
Pithoascus
Thielavia

Table 11
4) Comparison of *Petriellidium* strains producing ascospores on ascospore and vegetative attributes. a) Results of analysis with differential weighting.

```
MAP CLUSTER ANALYSIS:-PET. SPECIES ASCO CHARACTERS APPLICABLE TO ALL

(MINIMUM NUCLEUS 0.112, MAXIMUM DROP 0.0440 BOTH ARE 100% OF NORMAL)

CLUS OTU DIST OTU  AVGOF  DROP FAR DIST FLAG NAME OF OTU
TER  NOS BEST BEST  NEW    IN  OTU FAR
NO.      LINK LINK LINKS  AVG.     OTU
------------------------------------------------------------
  1    8                                      PB02217P
      12 0.03                                 PB04303P
       4 0.05     8 0.085 0.042  12 0.08      PB01285P
      13 0.05     8 0.065 0.018   4 0.10      PB04304P
       1 0.07     4 0.103 0.016  12 0.12      PB00002P
       5 0.08     4 0.120 0.017  13 0.13      PB01885N
       6 0.09     5 0.103-0.016  13 0.15      PB03873M
       9 0.09     8 0.115 0.012   1 0.16      PB03873M
      18 0.08     6 0.129 0.014  13 0.19      PEL38875
      11 0.09    12 0.125-0.004  18 0.16      PB04302P
       7 0.08    11 0.131 0.005  18 0.17      PB03238N
       2 0.07     7 0.120-0.011  13 0.15      PB00153N

      20 0.11    11 0.165 0.055  13 0.23 1000 PFU3897M
------------------------------------------------------------
  2   10                                      PB038925
      16 0.07                                 PAN3884M
      20 0.08    16 0.103 0.035  10 0.11      PFU3897M

      11 0.11    20 0.152 0.059  10 0.20 1004 PB04302P
------------------------------------------------------------

ISOLATED OTU'S (SINGLE MEMBER CLUSTERS)

CLUSTER OTU LABEL
      3   3 PB011018
      4  14 PB0521PS
      5  15 PAF4000S
      6  17 PDE38835
      7  19 PF14287M
```

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SEULE COPIE DISPONIBLE

Fig. 17
Taxometric map for comparison of *Petriellidium* strains producing ascospores on ascospore and vegetative attributes, differential weighting.

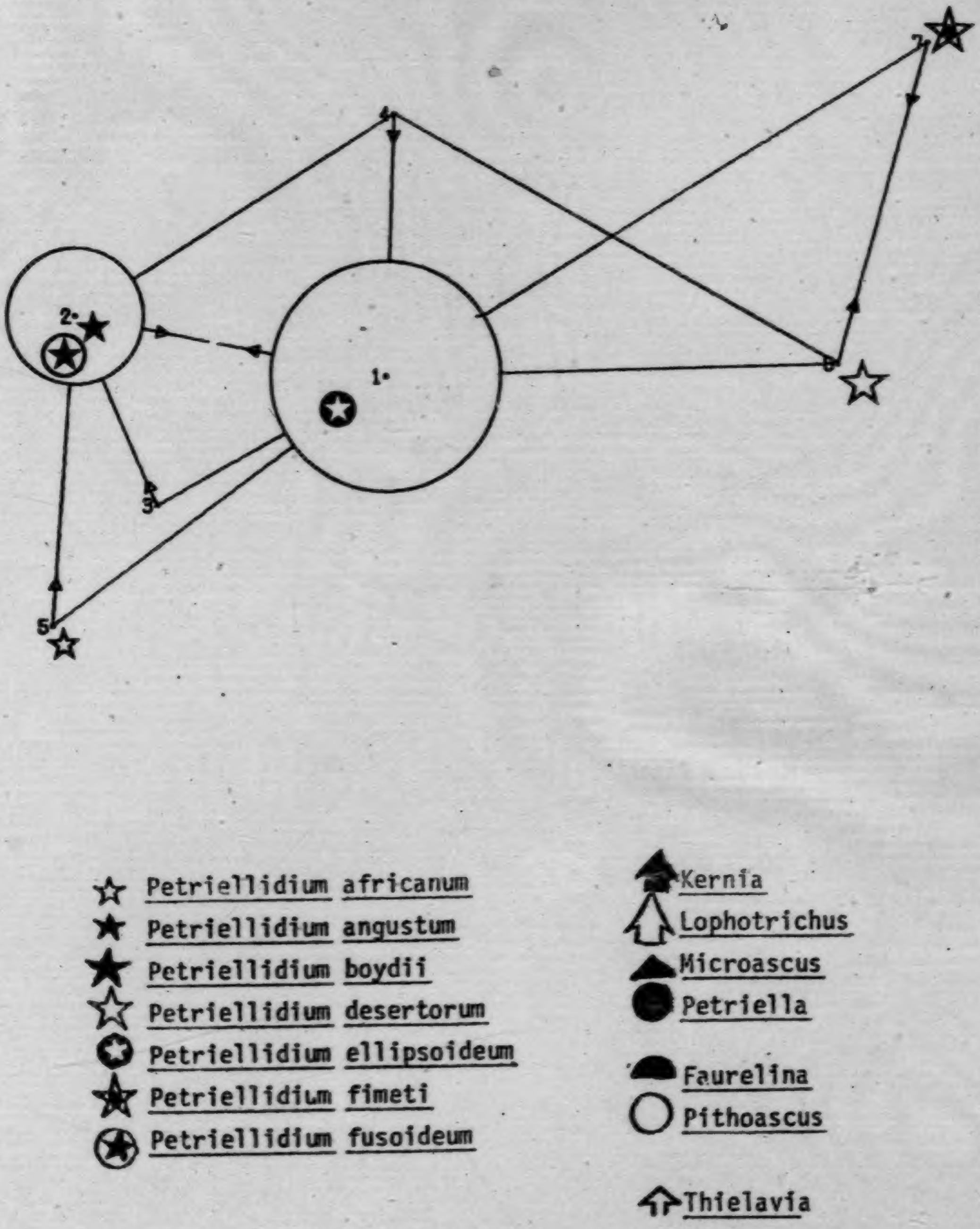
1
2
3
4
5
6
7
Petriellidium africanum
Petriellidium angustum
Petriellidium boydii
Petriellidium desertorum
Petriellidium ellipsoideum
Petriellidium fimeti
Petriellidium fusoideum
Kernia
Lophotrichus
Microascus
Petriella
Faurelina
Pithoascus
Thielavia

Table 12
4) Comparison of *Petriellidium* strains producing ascospores on ascospore and vegetative attributes. b) Results of analysis with equal weighting.

```
MAP CLUSTER ANALYSIS: PET. SPECIES ASCO CHARACTERS APPLICABLE TO ALL

(MINIMUM NUCLEUS 0.118, MAXIMUM DROP 0.0421 BOTH ARE 100% OF NORMAL)
EQUALLY WEIGHTED ATTRIBUTES

CLUS OTU DIST OTU  AVGOF  DROP FAR DIST FLAG NAME OF OTU
TER  NOS BEST BEST  NEW    IN  OTU FAR
NO.      LINK LINK LINKS  AVG.     OTU
----------------------------------------------------------------
  1   9                                       PB02217P
     12 0.02                                  PB04303P
     13 0.04    9 0.054 0.032  12 0.08        PB04304P
      4 0.07    9 0.085 0.031  13 0.10        PB01268P
      1 0.06    4 0.105 0.021  12 0.12        PB00062P
      6 0.08    4 0.118 0.013  13 0.15        PB03872M
      5 0.06    9 0.110-0.008  13 0.18        PB01865N
     18 0.07    6 0.121 0.011  13 0.17        PEL39875
      8 0.08    6 0.117-0.006   1 0.18        PB03873M
     11 0.11   12 0.148 0.030   5 0.19        PB04302P
      7 0.08   11 0.162 0.014   6 0.18        PB03239M
      2 0.08    7 0.136-0.025   5 0.17        PB00153M

     20 0.09   11 0.183 0.058   4 0.24 1000 PFU3887M
----------------------------------------------------------------
  2  10                                       PB03992S
     16 0.09                                  PAN3884H
     20 0.11   16 0.124 0.036  10 0.14        PFU3887M

     11 0.05   20 0.188 0.040  10 0.22    6 PB04302P
      LINK TO CLUSTER  -1
----------------------------------------------------------------

ISOLATED OTU'S (SINGLE MEMBER CLUSTERS)

CLUSTER OTU LABEL
      3   3 PB01101S
      4  14 PB0521FS
      5  15 PAF4000S
      6  17 PDE3993S
      7  19 PF14287M
```

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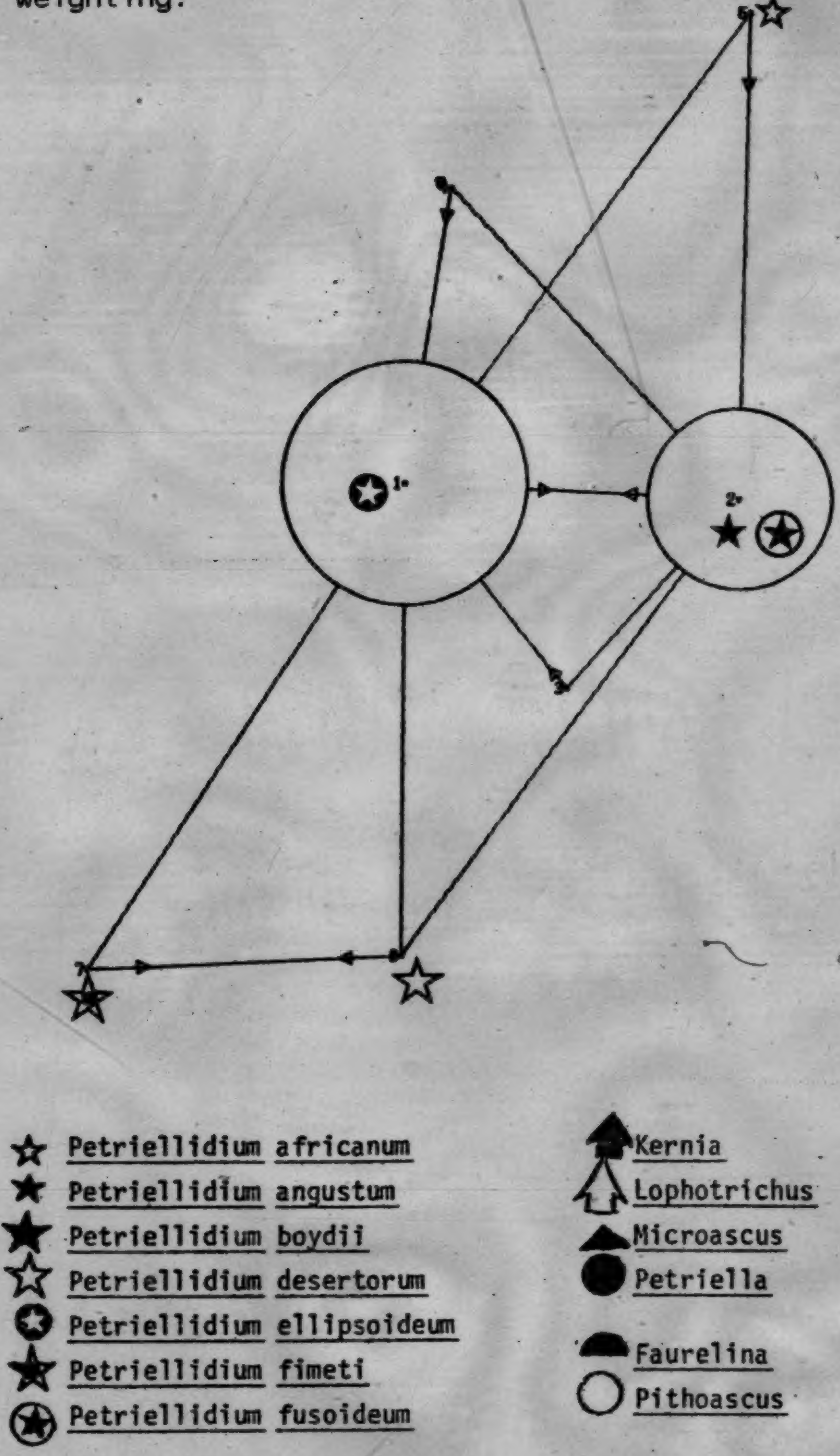
Fig. 18
Taxometric map for comparison of *Petriellidium* strains producing ascospores on ascospore and vegetative attributes, equal weighting.


1
2
3
Petriellidium africanum
Petriellidium angustum
Petriellidium boydii
Petriellidium desertorum
Petriellidium ellipsoideum
Petriellidium fimeti
Petriellidium fusoideum
Kernia
Lophotrichus
Microascus
Petriella
Faurelina
Pithoascus
Thielavia

b) Results of analysis with equal weighting.

Table 6 and Figure 12

The equally weighted analysis was similar to the differentially weighted analysis except that the *P. boydii* strains were separated more. The largest cluster contained 28 of the 38 strains, with three other species *P. angustum*, *P. ellipsoideum* and *P. fusoideum*. A second cluster contained eight *P. boydii* strains, the remaining two P. boydii strains UAMH 2324 and UAMH 3749 were isolated points, probably for the previously mentioned reasons. The rest of the *Petriellidium* species, *P. africanum*, *P. destorum* and *P. fimeti* were isolated points.

The *Petriella* strains were now contained within one cluster with only one isolated strain *Pe. musispora*.

The *Miscoascus* strains are grouped together in two clusters, one containing three species; *M. desmosporus*, *M.singularis* and *M. trigonosporus*, the other containing *M. longirostris* and *M. intermedius* plus the *Thielavia* and *Kernia* strains. Of the remaining *Microascus* species, *M. manginii* was an isolated point and *M. desmosporus* (wood) was clustered with *Lophotrichus*.

The *Pithoascaceae* strains *Faurelina* and *Pithoascus* were clustered as isolated points.

As in the differentially weighted analysis based on vegetative and conidial characters, the *Petriellidium* strains were nearest neighbours to each other except for *P. fimeti* and *P. africanum*.

2) Comparison of *Petriellidium* strains on conidial and vegetative analysis

a) Results of analysis with differential weighting.

Table 7 and Figure 13

All the strains were quite similar, none of the pairs being less than 67% similar (relative distance = 0.33).

The *P. boydii* strains were separated into six clusters of two or more strains (one cluster also included *P. angustum*). The main cluster contained 15 of the 38 strains. Three clusters contained at least one other species *P. angustum, P. ellipsoideum* or *P. fusoideum*. There were four isolated strains, UAMH 2324, 3749, 3750 and 3981. The remaining three *Petriellidium* species, *P. africanum*, *P. desertorum* and *P. fimeti* were isolated points.

The differentially weighted analysis based on vegetative and conidial attributes for the *Petriellidium* strains separated the *P. boydii* strains considerably. It is interesting to note that this analysis does not distinguish *P. angustum, P. ellipsoideum* or *P. fusoideum* from the *P. boydii* strains.

b) Results of the analysis with equal weighting

Table 8 and Figure 14

As in the differentially weighted analysis, all the strains were quite similar, none of the pairs being less than 67% similar.

The *P. boydii* strains were separated into seven clusters of two or more strains and three isolated points.

The main cluster contained 9 of the 38 strains with *P. ellipsoideum*. The two *Petriellidium* species, *P. angustum* and *P. fusoideum* were contained in clusters with at least one *P. boydii* strain. The remaining *Petriellidium* species, *P. africanum*, *P. desertorum* and *P. fimeti* were isolated points.

3) Comparison of all strains producing ascospores on ascospore and vegetative attributes

a) Results of analysis with differential weighting

Table 9 and Figure 15

The *Petriellidium boydii* strains were clustered into two clusters. The largest cluster contained 11 of the 14 *P. boydii* strains and *P. ellipsoideum*; the other cluster contained one *P. boydii* strain plus *P. angustum* and *P. fusoideum*. The remaining two *P. boydii* strains, UAMH 1101 and UAMH 4408 plus the remaining *Petriellidium* species, *P. africanum*, *P. desertorum* and *P. fimeti* were clustered as isolated points.

The *Petriella* strains were clustered as one cluster containing two species, *Pe. setifera* and *Pe. lindforsii* plus one isolated point *Pe. sordida*.

The *Microascus* strains were clustered as one cluster containing four species, *M. desmosporus*, *M. manginii*, *M. singularis* and *M. trigonosporus* and one isolated point *M. intermedius*.

The two *Thielavia* species were clustered together.

The remaining *Microascaceae; Kernia* and *Lophotrichus* along with *Pithoascaceae; Pithoascus* and *Faurelina* were clustered as isolated points.

It is noteworthy that in this analysis based on ascospore and vegetative attributes, the *Petriellidium* strains were nearest neighbours except *P. desertorum* and *P. fimeti*.

b) Results of analysis with equal weighting

Table 10 and Figure 16

The *P. boydii* strains were clustered as one cluster along with three *Petriellidium* species, *P. angustum*, *P. ellipsoideum* and *P. fusoideum*. The remaining *Petriellidium* species, *P. africanum*, *P. desertorum* and *P. fimeti* were clustered as isolated points.

The *Petriella* strains were grouped into two clusters; one cluster consisting of the *Pe. setifera* strains and the other included the remaining species *Pe. lindforsii* plus *Pe. sordida*.

The remaining genera were grouped as in the differentially weighted analysis.

As in the differentially weighted analysis based on ascospore and vegetative attributes, the *Petriellidium* strains were nearest neighbours except *P. desertorum* and *P. fimeti*.

4) Comparison of *Petriellidium* strains producing ascospores on ascospore and vegetative attributes

Table 11 and Figure 17

a) Results of analysis with differential weighting

The *P. boydii* strains were distributed among one main cluster, including 11 of the 14 strains plus *P. ellipsoideum*, a second cluster containing one *P. boydii* strain, (UAMH 3992), plus *P. angustum* and *P. fusoideum*, and two isolated points (UAMH 1101 and UAMH 4408). The nearest neighbour to UAMH 1101 is the *P. angustum* cluster. The remaining *Petriellidium* species, *P. africanum*, *P. desertorum* and *P. fimeti* were isolated points.

This differentially weighted analysis of *Petriellidium* ascospore producing strains based on ascospore and vegetative attributes could not differentiate *P. boydii* and *P. ellipsoideum* or *P. angustum* and *P. fusoideum*. It also included a *P. boydii* strain with the *P. angustum-fusoideum* cluster.

b) Results of analysis with equal weighting

Table 12 and Figure 18

The analysis was the same as the weighted analysis. except the isolated point UAMH 1101 is nearest neighbour with the *P. boydii* cluster.

IV. Taxonomic conclusions

A. Genera of the Microascaceae

Near the end of this study, Benny and Kimbrough (1980) proposed a revision of the orders and families of the Plectomycetes. Their key to the genera of the Microascaceae is reproduced in Table 13. The inclusion of *Arthrographis* under part A of the key appears to be an accidental substitution for *Sporothrix*. In all other respects, their key is supported by this study. The TAXMAP analyses generally grouped the species in conformity with the genera recognized in Benny and Kimborough's key. Their separation of *Pithoascus* and *Faurelina* as a separate family, the *Pithoascaceae*, is also supported by the isolated position of these two genera in the analyses. In 1973, von Arx transferred *Microascus intermedius* to *Pithoascus*, but this reclassification is not supported by this study.

B. Species of *Petriellidium*

The results obtained in this study did not agree with Von Arx's classification scheme for *Petriellidium*. *P. ellipsoideum* was judged to be conspecific with *P. boydii*, and *P. fusoideum* conspecific with *P. angustum*. The TAXMAP analysis supported this conclusion. The remaining species, *P. africanum*, *P. desertorum* and *P. fimeti* were found to be good species.

Table 13 Benny and Kimbrough (1980) Classification of the Microascaceae.

A. Ascocarps with a wall of *textura epidermoidea;* ascospores with two germ pores; anamorphs include *Graphium, Scedosporium,* and *Arthrographis*....................................B

AA. Ascocarps with pseudoparenchymatous walls composed of angular, dark cells......................C

B(A). Ascocarps ostiolate; ascospores reddish brown, often asymmetrical......*Petriella* Type species: P. *sordida* (Zukal) Barron & Gilman, *in* Barron, Cain, and Gilman, Can. J. Bot. 39: 839. 1961. Six species known (see Barron *et al.*, 1961a; Malloch, 1970a).

BB(A). Ascocarps usually not ostiolate; ascospores usually yellowish, rarely, reddish, symmetrical...............*Petriellidium* Type species: P. *boydii* (Shear) Malloch, Mycologia 62: 738. 1970. Six species known (see von Arx, 1973c).

C(AA). Ascospores embedded in a hyphal "capillitium" at maturity, each with a prominant germ pore.............................*Enterocarpus* Type species: E. *uniporus* Locquin-Linard, Rev. Mycol. 41: 513. 1977. Two species.

CC(AA). Ascospores small, not embedded in a "capillitium," or with two germ pores............D

D(CC). Ascocarps ostiolate; ascospores asymmetrical, with one germ pore.............................*Microascus* Type species: M. *longirostris* Zukal, Verh. Zool.-Bot. Ges., Wien 35: 339. 1885. Twelve species known (see von Arx, 1975c for key to species; additional species described by Ram, 1971; Udagawa and Furuya, 1978; see also Barron *et al.*, 1961b; Morton and Smith, 1963).

DD(CC). Not as above.................................E

E(CC). Ascocarps nonostiolate, with or without tufts of hairs; ascospores with one or two germ pores, hyaline, reddish, yellowish, or brownish.........................*Kernia* Type species: K. *nitidia* (Sacc.) Nieuwland, Amer. Midl. Nat. 4: 379. 1916. Five species known (see Malloch and Cain, 1971c for key to species). Syn.: *Magnusia* Sacc. *non Magnusia* Klotzsch (see Benjamin, 1956b).

EE(CC). Ascocarps usually ostiolate, with an apical tuft of thick-walled hairs; ascospores with two germ pores, yellowish or brownish..................*Lophotricus* Type genus: L. *ampullus* Benjamin, Mycologia 41: 347. 1949. Five species known (see Seth, 1971 for key to species; additonal species described by Morinaga *et al.*, 1978).

P. angustum was found to be quite similar to *P. boydii*, but differed by smaller, narrower ascospores. The *Scedosporium* states of these two species are indistinguishable. The TAXMAP analysis supported these observations. An important question is raised: is *P. angustum* pathogenic? Since its *Scedosporium* anamorph cannot be distinguished from *P. boydii*, this question needs to be answered by pathogenicity studies (Lupan and Cazin 1973, Bell 1978). The four strains of *P. angustum* studied here were all from saprophytic sources.

Strains UAMH 1101 and UAMH 3992 were found to be misidentified as *P. boydii* and were transferred to *P. angustum*. The remaining strains previously identified as *P. boydii* were found to be correctly identified.

P. fimeti UAMH 4257 did not produce a conidial state. It is not known whether the conidial states von Arx (1978) described for this species have been lost through subculturing or whether they represented a contaminant. *P. fimeti* was mixed with *Pithoascus langeronii* when received from CBS.

Key to the species of *Petriellidium*

Two keys to the genus *Petriellidium* are being presented; the first based on ascospore size, the second on conidium size. The key based on the *Scedosporium* anamorph is necessary because *Petriellidium* species do not always produce the ascogenous state, or if produced the ascospores may be immature and accurate measurements may unobtainable.

P. africanum is not included in the first key because it did not produce ascospores in this study. The presence or absence of the *Graphium* conidial state is not used in the keys due to its irregular and unpredictable occurrence.

Key to the species of *Petriellidium* based on ascospore size

(1)Ascospores larger than 9 um x 6 um.....*P. desertorum* & *P. fimeti*

(1)Ascospores smaller......................................2

(2)Ascospores 6-8.5 x 3.5-5.5um...............*P.boydii*

(2)Ascospores 5-6.5 x 2-4um................*P. angustum*

Key to the species of *Petriellidium* based on conidium size

(1)*Scedosporium* conidia present..........................2

(1)*Scedosporium* conidia not present...............*P. fimeti*

(2)*Scedosporium* conidia 5-10.5 x 2.5-6 um..*P. boydii* or *P. angustum*

(2)*Scedosporium* conidia smaller 3

(3)conidia 3.5-6 x 1-2.5 um no large chlamydospores. *P. africanum*

(3)conidia 4-8 x 1.5-4 um large chlamydospores present.. *P. desertorum*

P. desertorum and *P. fimeti* cannot be distinguished on ascospore sizes, however the *Scedosporium* conidia are not seen in *P. fimeti*. *P. boydii* and *P. angustum* cannot be distinguished on their *Scedosporium* conidia but their ascospore sizes differ.

C. Nomenclator of *P. boydii*

Negroni and Fischer's type of *Pseudallescheria shearii* UAMH 3973 was examined in this study and found to be a typical *P. boydii* anamorph. Although they misidentified their fungus, they did create a legitimate generic name for *Allescheria boydii*. However, previous investigators have not accepted or used *Pseudallescheria*. When Malloch (1970) reclassified *Allescheria boydii* to *Petriellidium boydii*, he missed Negroni and Fischer's genus *Pseudallescheria*, which should have been retained. In my opinion the name *Petriellidium* should now be conserved for two reasons; 1) Negroni and Fischer's type strain no longer produces the ascogenous state and therefore some doubt remains about its identification, and 2) researchers and medical mycologists have accepted the name *Petriellidium* as a replacement for *Allescheria*. Changing the name would only result in needless confusion. It would also enshrine a name based originally on a misidentification.

D. Composite description of *P. boydii* and *P. angustum*

P. boydii (Shear) Malloch 1970

Colonies on Oatmeal at first whitish becoming mouse brown or grey, reverse light to dark, colony texture matted fur. Mycelium hyaline, irregularly branched. Ascomata present or absent, spherical, non-ostiolate, usually submerged, brown-black in colour, translucent, wall of *textura epidermoidae*, 55.5-182 um in diameter. Asci spherical to ovoid, evanescent, eight-spored. Ascospores ellipsoidal, symmetrical, golden, with two polar germ pores, 6-8.5 x 3.5-5.5 um. Conidia of two types. Diffuse conidia (*Scedosporium*) state, normally present, clavate to ovoid, hyaline at first, then dilute yellow brown, borne singly or successively, directly from the sides of the hyphae or from the tip of annellidic conidiogenous cells, accumulating in small easily dispersed masses, 5-10.5 x 2.5-6.5 um. Synnematous conidia (*Graphium*) frequently absent, clavate to cylindrical, hyaline at first, then to dilute yellow brown, produced successively from annellate conidiogenous cells, accumulating in a slime ball at the tip of the synnema, 3-11.5 (22.5) x 1.5-3.5 (6.5) um.

This description was based on a combination of the characters of all *P. boydii* strains studied.

P. angustum Malloch and Cain 1972

Colonies on Oatmeal at first whitish, becoming light to dark mouse brown, reverse light to dark, colony texture matted fur. Mycelium hyaline, irregularly branched. Ascomata spherical, non-ostiolate, submerged, brown-black, transparent to translucent, wall of *textura epidermoidae*, 40-143 um in diameter. Asci spherical to ovoid, evanescent, eight-spored. Ascospores ellipsoidal, symmetrical, golden with two polar germ pores, 5-7 x 2-4 um. Conidia of two types identical to those described above for *P. boydii*.

This description is based on the four *P. angustum* strains examined.

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